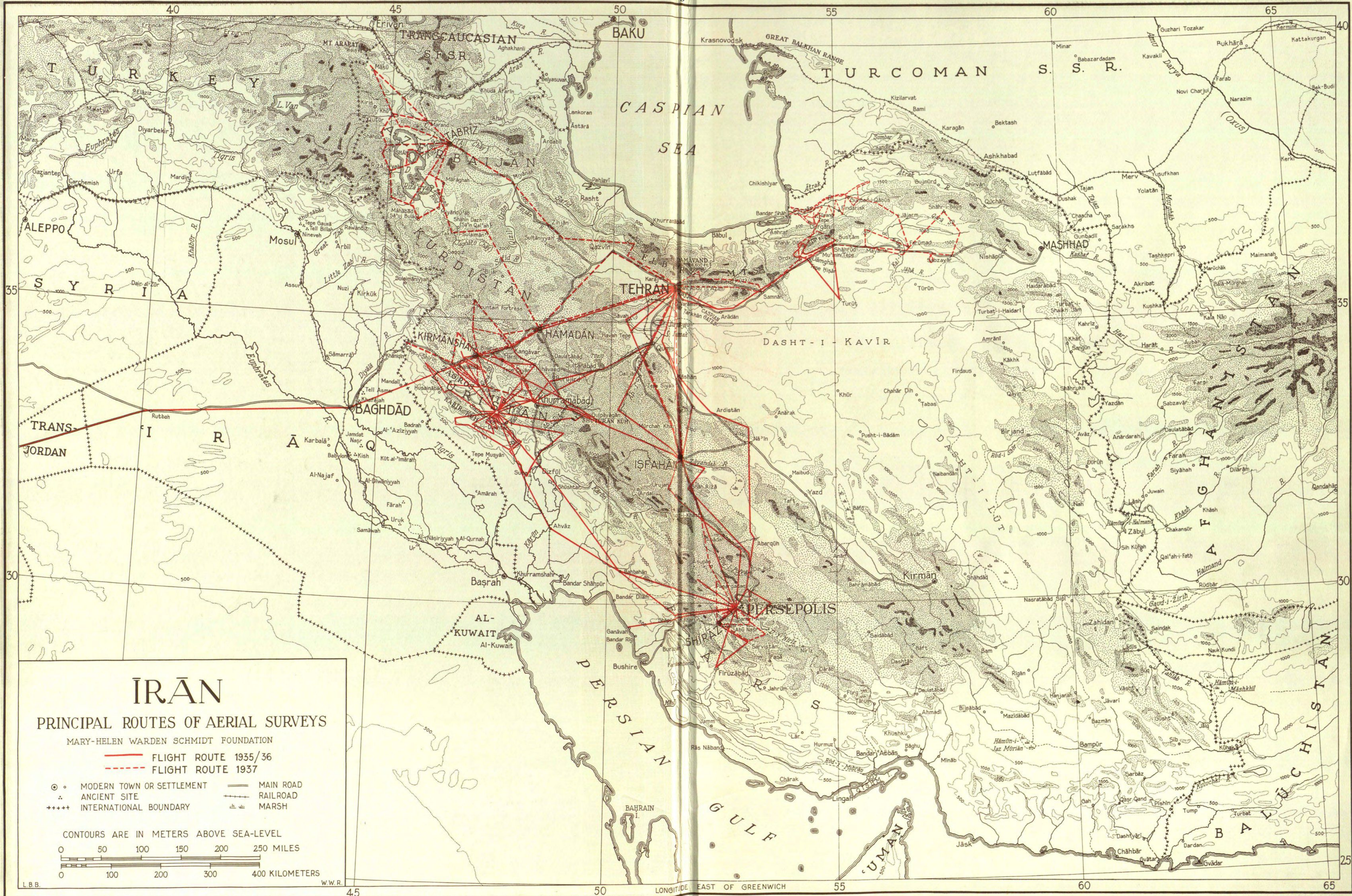


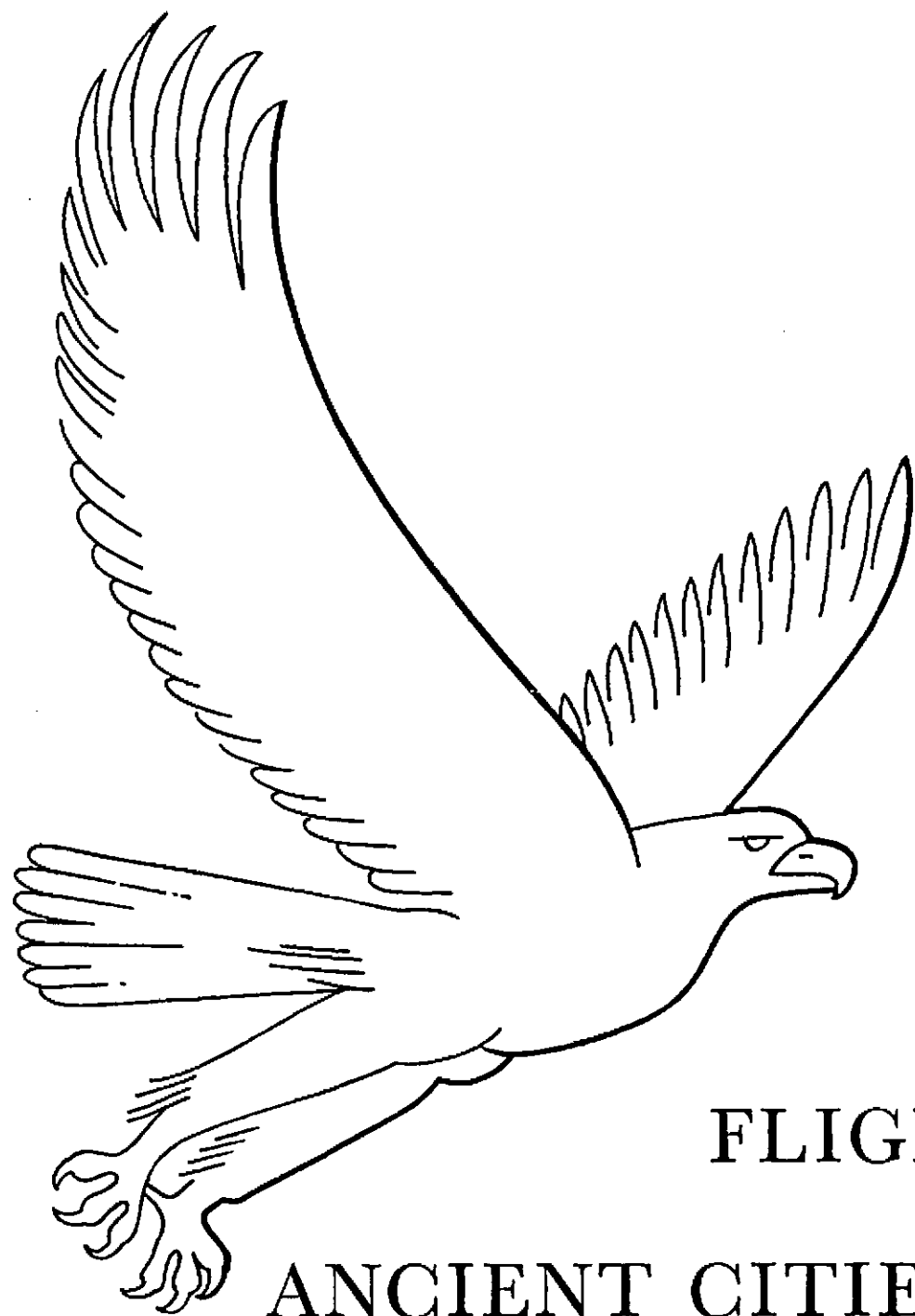


SPECIAL PUBLICATION OF THE ORIENTAL
INSTITUTE OF THE UNIVERSITY OF CHICAGO
JOHN ALBERT WILSON & THOMAS GEORGE ALLEN • *EDITORS*

FLIGHTS
OVER ANCIENT CITIES
OF IRAN

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FLIGHTS OVER
ANCIENT CITIES OF IRAN

BY ERICH F. SCHMIDT

Special Publication of the Oriental Institute of the University of Chicago

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*IN MEMORY OF MY WIFE MARY-HELEN WARDEN SCHMIDT AND
IN TRIBUTE TO HER WHO FOUNDED THE AERIAL WORK IN IRAN*

EDITORS' PREFACE

A VIVID sense of the uncertainties involved in field work as usually practiced must often assail the archeologist. First, after he decides what type of site and what period of time he most wants to study, comes finding of the site that seems most suitable. Then he must choose on the spot the areas most likely to contain significant structures. A citadel will usually stand out clearly; but what about other main buildings, streets, and houses? An excavator may be skilful and fortunate in his choices; if he is not, neither he nor anyone else may ever know what he has missed.

For meeting both the general and the specific problems the vision of the earth-bound traveler is limited. To see things as they are—ancient cities and towns in their complete geographic environment, streets and buildings revealing the ancient plans—the camera-equipped airplane has proved its outstanding usefulness. As Dr. Schmidt has stated in his Retrospect, there have been various pioneers in the field of aerial exploration; but Dr. Schmidt's own work, presented in this volume, has been carried beyond the stage of pioneering. To his lamented wife, Mary-Helen Warden Schmidt, the founder of the Aeronautical Department of his expeditions, and to Dr. Schmidt himself, the organizer and observer, are due the credit for a thoroughgoing demonstration of the permanent place of the air branch in archeological science.

ACKNOWLEDGMENTS

With respectful gratitude we acknowledge the graciousness of His Imperial Majesty

RIZA SHAH PAHLAVI

in permitting us to carry through the aerial explorations described in this book.

We remember gratefully His Highness Mohammed Ali Foroughi, then president of the Council of Ministers, a statesman and a scholar, who obtained for us the initial permit for our work. In the course of our aerial activities the formal difficulties of our task were facilitated by His Excellency Ali Asghar Hekmat, then Minister of Education, by Monsieur André Godard, director of the Service of Antiquities, and by Drs. Farahmandi and Sadiq.

General Afkhami, in his straight soldierly way, facilitated the organization of our activities with our rights and duties. Colonels Razmara and Davarpanah assisted us in every manner during the difficult explorations in Luristan. Lieutenant Tahiri, who accompanied us on most of our flights during the first phase of the aerial work, was a courteous and helpful companion.

The High Imperial Government of Iran has graciously given its permission for the reproduction of all the aerial photographs shown in this volume. For identification the film number of each photograph is given in the List of Illustrations.

With particular pleasure we remember the courteous help and friendship of the representatives of the United States and of Great Britain, Messrs. William H. Hornibrook and Cornelius V. H. Engert and Sir Horace Seymour, their families, and the staffs of their legations and consulates.

Our acknowledgments are also due to the Surveyor-General of India and to the Controller of His Majesty's Stationery Office for permitting us to reproduce certain maps of the Survey of India. The names of such modern villages, towns, etc. as are mentioned in the text but do not appear on the maps of this volume are given on maps of the Survey of India, "scale 1 inch to 4 miles."

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PART I
SEASON OF 1935/36

INTRODUCTION

THE SHIP

ONCE Mary-Helen had told me that she would create an aerial department for our expeditions, Lewin B. Barringer was taken into council, and he brought order into the chaos of our aeronautical thoughts. He suggested a Waco cabin biplane, well adapted for aerial photography. Its low landing speed and short take-off were definite advantages for explorations in high areas where landing possibilities were problematical indeed. We never regretted Lewin's choice. After test flights the Waco was ordered, equipped with a 220-horsepower engine and with the essential instruments. A spare tank fitted into the baggage compartment added about eighteen gallons of gasoline to the seventy gallons that could be carried in the wing tanks.

THE CREW

Lewin, an admirable pilot, reliable and conscientious, became the captain of our ship. But all enthusiasm, flying ability, and quality of equipment would have been in vain had it not been for Fred Lillich's mechanical knowledge. Our aerial companion was usually Lieutenant Tahiri of the Iranian Air Forces.

Mary-Helen, the founder, was with us on every exploration flight, rain or shine. On some observation and photo flights above the sites where digging was in progress members of the ground staffs also were at times taken along to give them a bird's-eye perspective of their place of work. The writer's task was archeological observation and photography. Boris Dubensky, for many years an efficient member of the camp circle, developed, printed, and enlarged the aerial photographs for further analysis.

THE AERIAL CAMERA

It was clear that aerial photographs would be essential for the pictorial documentation of archeological sites, though the full value of such records became known to us only after we had gained experience in their analysis and in their use for the ground activities of the expedition.

The camera problem was solved in Germany. In Jena we visited the famous factory of Karl Zeiss and were received with the greatest courtesy by Dr. Messter, the chief of the Aerotopograph Division, by Dr. Brucklacher, and by other gentlemen, all experts in some particular subject of interest to us. There was a great range of aerial cameras, including multilensed monsters with

electric release for automatic strip-mapping, beautiful mechanisms for the drawing of maps from aerial photographs, and the like. We decided on a "Fl. K. 19" for size 13×18 cm. (5×7 inches), light enough for our purposes. It was a gift to the Aeronautical Department by Mary-Helen's parents.

Here I may skip a year and mention that this camera was not quite adequate on account of its short focal length. The corners of the photographs were not sharp. Therefore, in 1936, Zeiss Aerotopograph exchanged that camera without extra charge for a larger model ("Fl. K. 25") with focal length of 25 cm. instead of 19 cm. The results with this camera were excellent.

As a rule we used Aeropan film rolls of one hundred exposures. Since film is definitely preferable for use on explorations and for transport, we rarely employed Aeropan or Aerochrom plates.

Further, after trying vertical photography in a very haphazard manner through a simple hole which Fred Lillich had cut into the bottom of the plane, in the second year of our flights we obtained infinitely better results by means of a special device of Aerotopograph. It is a suspension mechanism fixed to the upper edge of the hole in the plane bottom and carrying the camera. A telescope, its axis parallel to that of the camera, is attached to this device and shows exactly the rectangular ground section which would appear on the photograph at any given moment. Drift is corrected by the movable disk supporting the camera. By means of three screws the device is raised or lowered to a horizontal position defined by leveling-bubbles in the telescope and on the camera. Such a mechanism is indispensable for accurate vertical photography and mapping. The results were in most cases ideal.

CLEARING THE WAY

We were not to leave our tracks in the sky of Iran until some time had passed. In our enthusiasm the thought did not occur to us that any serious obstacle could arise and prevent the realization of our efforts to increase the scope and perspective of archeological work, nor did we consider that aerial operations, in spite of idealistic purposes, have delicate aspects, especially in the troubled countries of the Old World.

For several months it seemed as though our plans for aerial explorations would dissolve. It was a question of idealism versus political realities. Together we pleaded our cause; but it appeared almost hopeless until help came to us from the highest official of the country, His Highness Mohammed Ali Foroughi, a scholar who understood our motives. He submitted our final application to His Imperial Majesty and explained the scientific reasons and purposes of our endeavors. The Prime Minister was almost as happy as we were when he could tell us that His Majesty had graciously permitted the importation of the airplane. The manner of use was to be worked out by the General Staff, and after the completion of our studies the ship was to remain in Iran in order

INTRODUCTION

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not to establish a precedent for the importation of further aircraft with perhaps less desirable aims. Soon afterward the Minister of Education, His Excellency Ali Asghar Hekmat, gave us the official document stating the rights and obligations of our aerial activities.

In the meantime Lewin Barringer and Fred Lillich had tested the new airplane in America, crated it, and accompanied it on the voyage to the distant goal. In Alexandria our cable stopped crew and ship. We did not know then whether our Waco would ever cruise across the turquoise sky of Iran. Almost two months the men had to stay in sun-parched Egypt before another cable called them closer, to Baghdad, in summer even more trying than Egypt. At last, when the manner of use of the airplane had been formulated, we could call our ship to the country of its destination.

It was August 7, 1935, when the silvery "Friend of Iran" appeared on the western horizon of the Tehran airfield. There is no need to speak of our personal feelings, then and afterward. Enough to say that happy satisfaction of accomplishment accompanied the immeasurable broadening of the scope of our work.

PROBLEMS AND METHODS

Our aerial activities were threefold. There was, first of all, the observation, with photographic documentation and mapping, of the centers of ground work under the writer's direction. Persepolis in southern Iran, Rayy near Tehran in the north, and sites in the valley of Rumishgan in the western mountains were thus recorded.

Aerial exploration of archeologically unknown parts of the country with pictorial documentation of all important sites was actually our principal aim, though for the ground expeditions at work the analyses and map views of the sites under examination were of greater direct value. The map of Iran (inside front cover) shows the sky tracks of our explorations.

There were, finally, shuttle flights between Persepolis and Rayy, turning into a triangular track once the Luristan expedition to Rumishgan started operations. Needless to say, these commutings were at the same time thorough explorations with slightly changing courses.

In the beginning of our work in aerial archeology we were often bewildered by the multitude of ground details displacing one another at great speed; but soon we learned to "see faster," to systematize our impressions, and to read and analyze the landscape below. We learned to distinguish Islamic ruins (later than 7th century after Christ) from earlier historical sites (6th century B.C. until 7th century of our era) and the latter from prehistoric remains (in Iran, at the present state of our knowledge, prior to the 6th century B.C.). The obliteration of irregularities in ruins composed of identical structural debris exposed to identical climatic conditions is proportionate to the length of time which has passed since the desertion of a site. However, there

are exceptions. At Persepolis, for instance, the floods of more than twenty-two hundred winters and springs, rushing from the slope of the "Mountain of Mercy" across the mud-brick debris of the eastern defense wall at its base, have covered the structures to the west to such an extent that even to the flyer's eye their contours are invisible. Cultivation too is liable to destroy the faint contours of ancient buildings.

Islamic village forts, usually well defined rectangles with round towers at the corners, are, as a rule, easily distinguished from earlier settlements. Composite prehistoric sites, in the areas we have examined, have lost all contours of individual rooms and houses; a mound is all that is left. Depressions and elevations may indicate town squares and important buildings or clusters of houses. The sharp edge of a mound marks the course of a town wall. Moats are clearly defined depressions.

Flights for the principal purpose of photographic recording were, of course, always connected with visual ground surveys. The first two hours after sunrise were best adapted for our aerial photographs. After that the earth lost much of its relief. For the recording of the faintest ruin formations the first hour only was of use. It often happened that we took off before sunrise, circling and waiting until the sun changed the flat and, in twilight, expressionless ground below into a plastic map. On the other hand, higher formations, if taken too early, were apt to throw long shadows hiding details of value. Theoretically, the hour before sunset should have been just as good for our purposes; but we preferred the clearer air of the morning.

When taking vertical photographs we first decided on the direction of approach, and the approach was long enough for correcting the drift and for fixing the camera in horizontal position. It is not easy for the pilot to strike exactly the center of the area to be recorded. The telescope, as explained above, defined the section of the landscape which would appear on the film at any given moment. After we had obtained the suspension device, a second exposure with an overlapping of about 60 per cent immediately followed each vertical photograph, whenever further stereoscopic analyses were desired. Such stereoscopic pictures can also be reproduced in the form of anaglyphs, prints in green and red showing an extraordinary relief when seen through green and red celluloid spectacles.

On the printed blanks of the flight log we recorded the time, altitude,¹ direction of flight and of exposure, number of photograph (showing in a slot of the camera), length of exposure, filter number (if used), subject taken, and frequently the outside temperature. We used three grades of filters and three timings (in 1935: 1/70, 1/140, and 1/240 sec.; in 1936-37: 1/100, 1/250, and 1/600 sec.). The aperture (1:3.5) of the aerial camera was constant.

¹ In this book the altitude from which aerial photographs were taken refers to height above ground unless otherwise stated. Altitudes of topographical points, landing fields, etc. are given above sea-level.

INTRODUCTION

[7]

On subsequent pages we describe our method of mapping, which displaces almost entirely the expensive ground survey, while it adds valuable details.

THE BOOK

Part I deals with the results of our air work from the fall of 1935 through the spring of 1936. Due to currents beyond our control the exploratory activities of the Aeronautical Department were then stopped. However, in March, 1937, His Imperial Majesty Riza Shah Pahlavi graciously gave permission for one particular flight to the plain of Gurgan, frequently called the Turkoman plain, expressing in this manner his satisfaction with the work of the Persepolis Expedition, which he inspected, and acknowledging the value of our air work. Subsequently we received permits for two more flights, one to Azerbaijan and one to Luristan. But in the fall of 1937 the "Friend of Iran" was grounded again, and its wings have stayed clipped ever since.

Part II deals with these three exploratory flights of 1937, each resulting in the tracing of many sites, their pictorial documentation, and their location on archeological maps for the use of future excavators. An archeological map of the environs of Persepolis was made² which shows a decidedly advanced method of plotting. In thirteen hours of flying we succeeded in mapping more than four hundred ancient sites in the plain of Persepolis, a task of years if carried through on the ground.

² Illustrated in Erich F. Schmidt, *The Treasury of Persepolis and Other Discoveries in the Homeland of the Achaemenians* ("Oriental Institute Communications," No. 21 [Chicago, 1939]) Fig. 97.

FLIGHTS OVER PERSEPOLIS AND ENVIRONS

SOME NOTES ON THE PERSEPOLIS EXPEDITION

WITHIN the scope of this flight book we can only touch in a few words the results of the ground expeditions to Persepolis, Rayy, and Luristan. In 1931 the Oriental Institute of Chicago started to excavate the majestic ruins of Persepolis, in close cooperation with the High Imperial Government of Iran. During the field directorship of Professor Ernst Herzfeld, whose chief assistant was his architect, Friedrich Krefter, a magnificent stairway with beautiful reliefs was found at the east side of the Apadana or Audience Hall of Darius and Xerxes. In addition, foundation documents of gold and silver were discovered in the same building; they named Darius the Great as its originator. At the end of 1934 Professor Herzfeld retired from his field duties, and the writer was called by Professor James H. Breasted to continue the operations.

The most important discoveries of the three years 1935–37 include cuneiform foundation documents of stone recording in Old Persian, Babylonian, and Elamite previously unknown events of the reign of Xerxes. A reception scene before Darius and his chosen successor, Xerxes, is shown on two beautiful reliefs which were uncovered in a complex of buildings identified as the Treasury of Persepolis. Royal tableware of stone and loot from Egypt, Mesopotamia, and Greece were here found, together with many other objects of the greatest interest.¹

At this point the writer wants to express his acknowledgment to the staff members of the Persepolis Expedition, who through their ability and devotion to their work enabled him to pursue synchronously his other tasks. They were Donald E. McCown, field assistant and subsequently assistant field director; John S. Bolles, architect, and Mrs. Bolles; and Eliot F. Noyes, architectural assistant and subsequently expedition architect, followed in this position by R. Carl Haines. Boris Dubensky's excellent photographic work has been acknowledged in connection with the aerial crew as well.

GENERAL VIEWS

For the orientation of the reader Map 1 shows the environs of Persepolis, including the focal points of our aerial and terrestrial activities in this area referred to below. The center of our work was the Terrace of Persepolis, built between 520 and 515 B.C. by Darius the Great on a spur of

¹ See Schmidt, *The Treasury of Persepolis and Other Discoveries in the Homeland of the Achaemenians*.

Here the Oriental Institute of the University of Chicago excavated palatial remains of the Achaemenian period on and near the Persepolis Terrace, Islamic structures in the top stratum of the city mound of Istakhr, parts of a prehistoric village south of Persepolis, and important Sasanian inscriptions at Naqsh-e-Rustam.

what is now called the Kuh-i-Rahmat ("Mountain of Mercy"). The magnificent audience halls and residential palaces built by Darius, his son Xerxes, and Artaxerxes I and III perished in flames when the Macedonian conqueror, Alexander the Great, in 331 B.C. made Persepolis the pyre of the Achaemenian dynasty and empire. It is the debris of this catastrophe of twenty-four centuries ago that the expedition is clearing, in an attempt to find the "crumbs which Alexander left," to reveal once more the plans of the obliterated structures, and to restore, where possible, those fragments which have survived. Let us see to what extent the air work could help the ground crew in this task.

In order to gain a good understanding of the topography of a given site it is advisable to supplement the vertical map view by an oblique photograph. Two general pictures of Persepolis (Pls. 1-2) prove this statement. Certain proportions of height can be much better visualized on the oblique, such as the levels of the Terrace proper, the height of the columns as compared with the other ruins, the position of the rock tomb of Artaxerxes II (or III?) above the Terrace, and the height of the latter above the plain. Further, the frame of the panorama is enlarged and gives the perspective of the landscape. Finally, the aesthetic effect of the oblique photograph is considerably greater than that of the vertical, as can be verified by comparing the views of Naqsh-i-Rustam also (Pls. 11-12).

In spite of these considerations in favor of the oblique, the vertical photograph is much more valuable for our purposes. It maps the formation and coloration of the ground with innumerable details which, if entered on a drafted map, would make it absolutely unreadable. Below, in connection with Istakhr, prehistoric mounds, Naqsh-i-Rustam, and other sites, we shall show that the vertical air photograph entirely displaces the expensive and for our purposes less valuable ground survey of mounds, the excavation of which is contemplated. In the case of intricate ruins of elaborate structures with delicate details, such as the palatial remains of Persepolis, a drafted plan is an essential supplement to the aerial map.

The key sketch overlying Plate 2 points out the principal features of this picture. The most outstanding help to ground work is the restoration of the two eastern lines of defense with their towers and curtain walls, marked by light and shadow on the aerial view. The map panorama of the entire site is, of course, an invaluable guide for all operations on the ground.

THE TERRACE

The line plan of the Terrace proper (Pl. 4) forms in this case, as mentioned above, an essential supplement to the air photo (Pl. 3). The plan restores also, to a certain extent, the contours of structures buried beneath the debris. It shows the stairways and the divisions of the buildings more clearly, and it records the covered rooms of the restored Harem and the drainage system, not at all visible on the photograph.

Plain ruin deposits and mound formations, on the other hand, are much better marked on the air view than on the drafted map. On the Persepolis air picture a mistake in judgment is shown by the different orientation of plan and photograph. The line of flight should have been parallel to one of the axes of the plan. The small white circles with black center, ringed in black on the photograph, are 100 meters apart and correspond exactly to certain 100-meter points marked by crosses on the drafted plan of the Terrace. On the photograph they form a base line for the air map. Our system of ground control is more fully discussed on page 13.

THE EXCAVATIONS

The aerial photograph (Pl. 5 *A*) shows in an ideal manner the area of the excavation in its topographic environment. It gives an unretouched general view and adds certain features missing in the abstract plan (Pl. 5 *B*). There are the railroad tracks, indicating the manner of dirt removal; a delicate net marks the site of the potsherd yard near the Terrace edge; and so forth. Doubtless, the aerial photograph is a valuable supplement to the architect's plan. However, the latter furnishes through certain symbols, omission of debris, and partial restorations a clear-cut and easily intelligible picture of the ancient structures, further explained by legends and filled with find-spots of important discoveries.

CLOSE-UPS

There is not much time for selecting when one is roaring past photographic targets at a speed of more than 100 miles an hour and 50 yards above the ground. For only the fraction of a second a desired scene passes in front of the camera sight. In this manner Plate 6 was taken, an oblique close-up which shows a Terrace section. The beautiful residential palace of Darius the Great with the Egyptianized lintels of its gray limestone gates and with its reliefs on jambs and Terrace façade is seen in the foreground. The columns of the once magnificent Audience Hall of Darius and Xerxes rise, gold-brown in certain lights, in the left center, while the debris of Xerxes' and Artaxerxes I's Hall of a Hundred Columns lies, somewhat lower and to the right, behind the portals of the Tripylon. The tomb of Artaxerxes II (or III?) is cut into one of the gray rock cascades of the "Mountain of Mercy."

An excavation scene (Pl. 7) concludes the Persepolis illustrations. Laborers hustle to expand the excavation within the rigid squares of the survey grid. Dump cars busily rumble on their tracks to carry the debris outside the Terrace area. The tinkling of picks and shovels, the laughing and chattering of the crew, and the cursing of Baba Khan, the foreman, fill the air. In the excavated courtyard of the Persepolis Treasury one of the newly discovered reliefs shows Darius the Great seated on his throne with his son and successor Xerxes behind him. A Median dignitary of the court stands before Darius in respectful attitude. Court officials, among them the Carrier

of the Royal Battle-Ax and Bow, and guards complete the impressive scene. Restored by Professor Herzfeld and Friedrich Krefter, the Harem of Xerxes is seen beyond the excavations. Where once the royal ladies lived are now the workrooms, the museum, and the living-quarters of the expedition staff; and often visitors from various corners of the earth join the camp circle of the Persepolis Expedition.

THE CITY MOUND OF ISTAKHR

On Map 1 is shown the extensive Istakhr mound, 5 kilometers north of the Persepolis Terrace. It is a composite site of superimposed cities. Our soundings revealed beautiful ceramics of the Early Islamic city, which ceased to exist in the 10th century of our era. A test in the western spur of the mound uncovered remains of the Sasanian epoch, which ended with the invasion of the Arabs and Islam in the 7th century after Christ. So far coins only have indicated the presence of the pre-Sasanian town which with Ardashir I revolted in the 3d century against Parthian rule and in which Ardashir's ancestor had been a priest in the fire temple of Anahit. Architectural fragments only suggest the existence of Achaemenian structures; and a few sherds and flints, mixed with later debris, may indicate a prehistoric village buried somewhere below the extensive towns of later ages.

We show two vertical air views (Pls. 8 and 10) of the Istakhr mound and, for comparison, a drafted map (Pl. 9). Here the writer wants to state parenthetically that the analysis of the Istakhr air views is based on the flight experience of an additional year (1937). We have considerably advanced in our analytical ability since the time when we considered the extraordinary "X-ray" view of Plate 10 a "dirty and inadequate photograph" as we compared it with the beautiful relief of the picture taken in the fall (Pl. 8). The air map of Istakhr is in fact our most striking example of the advantage of the aerial photograph with fixed ground control over the drafted ground survey of mound deposits.

The line map of Istakhr (Pl. 9) was compiled and drawn with infinite labor by the former architect and the architectural draftsman of the expedition. It is an excellent map; but the analysis of the two aerial photographs of the same area clearly indicates in this case the shortcomings of the ground survey as compared with the aerial map view. Furthermore, upon consultation of the legend of the line map it appears that it was started in November, 1933, and finished in June, 1935. True, there were exceptional handicaps; but even under normal conditions many months are required to complete an accurate survey of such a site. The air map, on the other hand, including the staking of the ground control, can be made available to the excavator in two days, or even sooner in the case of smaller sites.

We shall first consider the vertical photograph of Istakhr taken in the fall of 1935 (Pl. 8). At that time we had not yet developed our method of aerial mapping, and the essential ground

control is missing. Still, there are some striking revelations. No contours on the line-drawn map could possibly be interpreted as the faint depressions that give us on the aerial photograph the main thoroughfares of the city, dead for a thousand years! Besides that, there is hardly a doubt that the streets of the Islamic city followed the courses of earlier thoroughfares. Furthermore, at those points where the streets end at the mound edge, that is, at the city wall (see below), gates must have existed and likewise, to go a step further, bridges or fords across the river beyond. When we followed this clue at the northwest end of one of the streets, the gate formation appeared where expected. The second significant point is the convergence of two thoroughfares north of the ancient mosque (in quadrant HL) partly excavated by Herzfeld. Here we may have to look for the commercial center of the last city. According to Islamic historians the bazaars of Istakhr were situated near the main mosque (marked on Pl. 9). Furthermore, we are justified in assuming that prominent buildings bordered the main avenues of the town.

From the practical expedition viewpoint the most outstanding achievement of the Aeronautical Department is the development of the aerial photograph into an excavation map. If the "Friend of Iran" had been available at the beginning of the expedition to Rayy considerable funds could have been saved. Once our air map was developed the expensive ground surveys were abolished, and all subsequent excavation projects were based on aerial photographs.

The method is extremely simple and fast. In order to make the air view at once applicable to the ground operations certain base points have to be marked on the surface. Since our entire excavation system is based on a survey grid of quadrants 100 meters square subdivided into one hundred excavation plots each 10×10 meters, the ground control consists in fixing some of these points. In the case of Istakhr (see Pl. 10) we chose a crossline oriented, as always, according to the main directions and subdivided by points 100 meters apart. Cloth circles 2 meters in diameter, with black center, mark the base points, which appear as small circles on the photograph. The preparation of the ground is herewith completed.

On the vertical photograph, enlarged to the size desired, or, in the case of a very extensive site, on a mosaic of several sections, parallel lines drawn through the centers of the base points complete the grid of 100-meter quadrants. Those areas defined as promising by analysis of the air view and then verified by an examination of the ground are subdivided on the aerial map by means of a proportional divider into the final excavation units of 10×10 meters. This process is repeated on the ground. The excavation plots are laid out, and the work may start. In addition, the ground work includes next the determination of the relative height of all corner points in relation to a common zero mark by the simple process of level-shooting. The depth of the finds is subsequently defined by their position relative to the corner stakes.

The general relief of the site is given for all practical purposes by the air view, especially if

combined with an oblique. The Zeiss mirror stereoscope with parallel guide will, furthermore, determine the relative height of each point in relation to all others. For this purpose two vertical views are regularly taken of each important subject, so that they may be examined stereoscopically.

We shall now proceed to the analysis of the second air view of Istakhr and compare it too with the drafted map. The air map on Plate 10 was taken in the spring, when the Aeropan film refused to register the relief of the grass-covered site, at first appearing to our untrained eyes as a bad picture with dirty spots. However, we learned to see a wealth of information on this photograph. The streets, faint depressions on the view taken in the autumn, were found to be white streaks on the photograph taken in the spring. Then crooked lanes typical of oriental towns joined the thoroughfares. Even more, we learned to see the buildings and even the rooms of houses bordering the streets of Istakhr a millennium ago! A white line, finally, with round projections, limiting the area of the mound, gave us the plan of the city wall and the towers of old Istakhr.

None of these features, decisively important for the planning of the excavations, appear on the drafted map (Pl. 9). There are no depressions marked that could possibly be interpreted as streets or lanes, not to speak of any indication of contours of buildings that have disappeared below the characterless rolling surface of this mound. It is true that on the line survey of Istakhr the sharp edge of the deposit, together with clues found during surface examinations, indicates without doubt the presence of a city inclosure. But the air view actually maps the course of the city wall in almost its entire extent!

Considering the results of the aerial analysis of the Istakhr site, we are well justified in stating that the aerial map view with fixed ground control ideally fulfils the requirements of an archeological mound survey and displaces the drafted map. The vertical air photograph supplies a wealth of surface criteria through the mound relief and through the coloration of the surface and guides the excavator to promising points of attack. Further, it gives the contours limiting the area of his activities, the character of the environs, and, through some fixed points, the rigid units of his excavation system. We repeat, however, that the air view does not suffice for ruins above ground, as in the case of Persepolis, nor is it satisfactory for the accurate surveying of excavated structures.

Furthermore, we must admit that results such as shown by the Istakhr air map are dependent on the season. In the fall we obtained only a fraction of the information given by the view which was taken in the spring, in spite of the fine relief of the former photograph. This is due to the fact that the verdure covering the site in spring is less dense above the tops of the buried wall foundations and above hard-tramped areas, such as streets, than over the loose and fertile humus filling former rooms, garden patches, and the like. Thus the relatively sterile wall tops, street courses, and so forth appear as light-colored lines in the dark areas of greater fertility.

THE SACRED PRECINCT OF NAQSH-I-RUSTAM

Three kilometers west of Istakhr a rocky spur of the mountain now called Husain Kuh was chosen by Darius the Great as his final resting-place, and three of his successors followed his example. Naqsh-i-Rustam ("Picture of Rustam") the Iranians call this awe-inspiring spot, where in rock tombs with cruciform façades the bodies of the powerful monarchs of Achaemenian Iran were laid to rest. Darius' successors faithfully copied his tomb façade, except for its trilingual inscription. Cut into the rock, the winged symbol of Ahura Mazda, god of the Zoroastrian religion, hovers above the king, whose hand is raised in a gesture of worship. Subject nations carry his throne, which is flanked by high dignitaries of the court.

Sasanian kings immortalized their favored themes below the tombs of their illustrious predecessors, and one of the Sasanians economized in labor by cutting his relief into the earliest scene indicating the importance of this mountain spur, an Elamite relief presumably of the 2d millennium B.C.

The impressive photograph on Plate 12 was taken as the "Friend of Iran," about 90 meters above the ground, with wide open throttle, raced past the rock of Naqsh-i-Rustam. The left center of the picture shows the faint outlines of the cruciform tomb façades of Darius (to the right), Artaxerxes I, and Darius II. That of Xerxes is hidden in the shadows to the right of his father's tomb. The rectangular structure in front of the cliff is called the Ka'bah-i-Zardusht ("Cube of Zoroaster"). It may have protected the body of one of the earliest Achaemenian kings; but opinions as to its purpose are divided. The trench cut into the elevation which limits the sacred area was excavated by Professor Herzfeld in order to determine the course and character of the inclosure.

Historians of the Islamic era will be interested in the central table mountain in the background. It is Kuh-i-Istakhr ("Istakhr Mountain"), the almost impregnable place of refuge for the townsfolk of Istakhr in times of distress. On its top are traces of fortifications and a water basin which is said to have burst during a siege, because of an earthquake, and forced the defenders to surrender. This reservoir is close to the precipitous cliff, in a deep depression cutting across the left half of the mountain top.

The test excavation at Naqsh-i-Rustam was entirely planned and mapped by means of aerial photographs. Plate 11 shows vertical views of the area before and after the start of the test. The air map required in this case only one quadrant of 100×100 meters, here partly subdivided into 10×10-meter plots. The latter had been laid out in such a manner as to cross an elevation, defined by previous air and ground examinations, in front of Darius' tomb. This elevation suggested the presence of some important structure, and its position in front of the tomb of the great ruler appeared to be significant.

The excavation proved, however, that this conclusion was wrong. The elevation was caused by a stratum of Umayyad (Early Islamic) occupation later by centuries than the royal tombs, but superimposed on earlier remains. A stack of Sasanian silver coins with Umayyad inscriptions found on the floor of one of the uppermost rooms and dating them was partial consolation. Below, we uncovered Sasanian seals and other objects of this period (3d–7th century of our era); but the most significant discovery was a well built structure deeply buried beneath the debris of later times. The test had to stop for the time being; but we hope to follow this clue, for the walls in this lowest stratum have grayish green plaster like that of the Persepolis palaces.

Plate 11 *B* shows also a cluster of workmen beside the square top of the Ka'bah-i-Zardusht. On the eastern face of this building we discovered a long and important Sasanian Pahlavi inscription, which has been tentatively read and interpreted by Professor Martin Sprengling.² He believes that this inscription proves the Ka'bah to have been the fire temple of Anahit, where the Sasanian kings were crowned and where probably their crown jewels were kept. We reserve judgment until the environs of this structure are entirely excavated.

Ancient quarries are indicated on the dark mountain slope filling the upper half of Plate 11 *A*. Parallel slashes mark the spots where rock slabs have been cut out. Identical quarries occur in the vicinity of Persepolis, and it is quite possible that those at Naqsh-i-Rustam were used not only for the Ka'bah but for structures still buried below later debris in the sacred precinct.

PREHISTORIC MOUNDS

Tall-i-Bakun is the name now given to two round hillocks rising slightly above the ancient plain called Marv Dasht, where about two hundred generations of man have come and gone since Tall-i-Bakun A was a little town teeming with life. We do not know what happened to the ancient settlers who lived here at the beginning of the Age of Metal. Apparently they fled in haste, to judge by the excavators' observations. At any rate, once the town was deserted, the debris of falling roofs and walls formed the core of the present mound. Humus accumulated from plants growing on top, and the rains and winds of thousands of winters washed and ground the surface until only a smooth hillock betrays the spot where once a town had been.

The air map of these prehistoric hills (Pl. 13) is fair but not ideal. Yet it perfectly fulfils its purpose, and the entire work which followed was based on it. The growth of spring disturbs its

² *American Journal of Semitic Languages and Literatures* LIII (1937) 126–44 and *Zeitschrift der Deutschen Morgenländischen Gesellschaft* XCI (1937) 652–72.

During the continuation of the excavations, in 1939, it was found that this text is one version of a trilingual inscription of Shapur I. The other two versions are in Greek (on the south wall) and in Parthian Pahlavi (on the west wall). There is, further, an inscription of the high priest of Shapur and his two successors. It was determined that the Ka'bah stands on a stepped pyramidal foundation.

relief, and the mound crust is too thick or too disturbed to show the discoloration of uneven growth, due to walls, such as is seen on the Istakhr map view (Pl. 10). On the other hand, there is one feature which should have given us a clue as to disturbances of the mound crust. If this photograph had been taken after a rain, here preferably in the fall, we might have seen dark parallel streaks representing graves of the Islamic era which would have retained the moisture longer than the undisturbed ground beside them. This is simply a logical conclusion based on subsequent digging experience.

The points of the ground control are, as usual, 100 meters apart. They were laid out in preparation for further tests to expand the work of the former excavators, Herzfeld and Langsdorff, in the western mound and to start soundings in the eastern one. On the photograph the grid has been completed by connecting with white lines the quadrant corners, marked on the ground by cloth circles as described in the discussion of Istakhr. One quadrant is subdivided into a hundred excavation plots.

West of the western hillock the rectangular contour of a typical Islamic *qal'ah* ("fortress"), in this case a fortified manor or small village with a tower at each corner, is plainly marked. South of the prehistoric mounds are the ruins of a historical but pre-Islamic town where the courtyards, rooms, and certain lanes between the houses are well indicated. It ceased to be occupied more than thirteen hundred years ago.

Ceramics with magnificent patterns were found in the main deposit of the western hill. Their makers lived in the 4th millennium B.C. Somewhat later another village rose on the earlier settlement; but its inhabitants had not advanced beyond the status of their predecessors. Their implements had stayed about the same, and their pottery was even far inferior to the earlier ware. The forms are simple. The beautiful designs have disappeared and been displaced by a plain red finish. In the second, eastern hill we found a very primitive culture, characterized by plain coarse pottery and astonishing numbers of bone implements, while the flint tools were similar to those found in the other hill. Quite a few copper objects from the western mound (Tall-i-Bakun A) indicate that it began to be settled in the beginning of the Age of Metal, while Tall-i-Bakun B was occupied during the New Stone Age.³

³ Finds made during his preliminary investigation of Mound A in 1928 were published by Ernst Herzfeld in *Iranische Denkmäler I A* (Lfg. 1-2; Berlin, 1932). He and Alexander Langsdorff later conducted an excavation there, a report on which by Langsdorff and D. E. McCown is now in press. A still later campaign (that mentioned above), under the writer's charge, involved both mounds.

FLIGHTS TO FAMOUS AND FORGOTTEN SPOTS IN THE SOUTHERN MOUNTAINS

PASARGADAE, THE CAPITAL OF CYRUS THE GREAT

ONE of our first aerial reconnaissances took us to the capital and the tomb of the founder of the Achaemenian empire, and several more times we circled above the plain now called Murghab, where ancient Pasargadae once flourished. On Plate 14 we show the terraced pyramid and the chamber of stone which once contained the remains of Cyrus the Great. Mashhad-i-Madar-i-Sulaiman ("Shrine of the Mother of Solomon") the Iranians now call the tomb of the great ruler, which is said to have borne the inscription: "O mortal, I am Cyrus the son of Cambyses, who founded the Persian empire and was lord of Asia. Grudge me not, therefore, my monument."¹ For two centuries his embalmed body and his tomb furniture, including a sarcophagus of gold and precious fabrics, had lain here, when the soldiers of the victorious Alexander desecrated and rifled the tomb. It happened during the absence and against the will of Alexander, who was then on a campaign to the east.

The aerial photographs show also the remains of columns once inclosing a rectangular court around the tomb. However, these columns did not belong to the original structure but were erected in the 13th century after Christ.² Mounds of doubtful age are near by, and hundreds of Muslim burials crowd the vicinity of the pyramid, which has become a sacred spot of Islam.

The vertical photograph (*B*) gives the map view of the tomb, its inclosure showing white dots of broken columns and innumerable dashes, graves of the humble in faith seeking salvation near the tomb of one greater than they. The clearly outlined hillocks near Cyrus' pyramid may deserve examination; but the direct environs could hardly be examined, owing to the Muslim graves. There may be additional remains in the farther environs of the tomb; but the air views show mainly the grids of irrigated fields without the contours of particular buildings.

One of our most interesting aerial discoveries was revealed by the vertical photograph of Takht-i-Madar-i-Sulaiman, the platform of Pasargadae, shown on Plate 15. We ourselves and many other archeologists and travelers had wandered over this site; but neither we nor any of the others had ever noticed the polygonal fortification wall so plainly marked on this air view. The towers even are indicated by round expansions distributed at certain intervals along the line of

¹ Arrian *Anabasis of Alexander* vi. 29.

² Herzfeld in *Archaeologische Mitteilungen aus Iran* I (1929) 8.

FAMOUS AND FORGOTTEN SPOTS IN THE SOUTH [19]

the defense wall. Since it extends from the doubtless important citadel or palace platform, one should assume that the fortification inclosed structures of interest, though the photograph does not give any clue as to their presence.

When combing the plain of Pasargadae from above we agree with Professor Herzfeld that the site was mainly occupied by palaces and parks.³ There were no indications of the presence of a continuous town. Individual palace or temple mounds, partly tested by Herzfeld, are scattered over the plain. Again we have to admit the possibility that town deposits may have been obliterated or covered by periodical floods and leveled by cultivation, as happened even in the case of the much later city of Rayy, described below.

There are still untouched mounds at Pasargadae. The fortified area defined by the air photographs, including the stone-built platform with its deposits, is well worth examining, and the partly tested structures deserve complete excavation. One must consider that Pasargadae was the forerunner of Persepolis and that it should reveal still further prototypes of Persepolitan art and architecture.

ANCIENT GUR, A CAPITAL OF THE SASANIANS

In three-quarters of an hour our airplane took us from Persepolis to the valley of Firuzabad, while a tedious ride by car and on horseback brings the overland traveler at the end of a day to this site of ancient Gur, built by Ardashir I in defiance of the Parthians during the first half of the 3d century of our era.

The palace of Ardashir,⁴ at the edge of the Firuzabad valley, appears on the oblique and vertical photographs of Plates 16 and 17. They show the characteristic semiparabolic domes of Sasanian architecture, though there are certain other traits, for instance Egyptianized lintels of Persepolis type, which made Marcel Dieulafoy believe that the structure was Achaemenid.⁵ The air views, further, mark the general contours of the palace complex and its masses of rubble debris; but as to details of construction the publications mentioned in note 4 should be consulted. That part of the palace which is still standing above ground measures about 98×52 meters. These dimensions supply a scale for all other desired distances on the photographs.

The large dark spot in front of the building is a spring which had been included in the palace compound. This is clearly shown, on Plate 16 in particular, by the rectangular wall extending

³ Cf. *ibid.* pp. 4-16; for detailed descriptions of the Pasargadae structures cf. also Friedrich Sarre and Ernst Herzfeld, *Iranische Felsreliefs* (Berlin, 1910) pp. 147 ff., and George N. Curzon, *Persia and the Persian Question* (2 vols.; London, 1892) II 71 ff.

⁴ For description see Flandin and Coste, *Voyage en Perse ... pendant les années 1840 et 1841* (Paris, 1851-54) II 345-48; Marcel Dieulafoy, *L'Art antique de la Perse* (5 vols.; Paris, 1884-89) IV; and reference in Sarre and Herzfeld, *Iranische Felsreliefs*, pp. 128 f.

⁵ *Op. cit.* IV 59 ff.

from the most prominent section of the palace and inclosing this spring. A gate construction or a large niche is suggested by a projection beyond the spring on the right side of the inclosure, as viewed on Plate 16, and the palace proper seems to extend farther to the left than Dieulafoy's plan indicates.⁶ The latter shows the circular basin, but it omits the above-mentioned outer inclosure.

Recent corrals or hut foundations are scattered inside and in the vicinity of the palace area. On Plate 16 a modern village with huts and corrals is seen in the background.

One of our most striking photographs (Pl. 18) records the circular city of Gur or Jur. The view here given was not our only attempt to retain the impressive panorama of Ardashir's town. While flying in concentric circles we tried several positions of the sun. The present view, taken roughly toward the northeast, was the best. The analysis of the photograph suggests a double peripheral city inclosure, the two walls being separated by a deep moat. There is a chance that the apparently lower circumvallation at the outer edge of the moat is the result of dirt thrown out of the depression. On the other hand one would assume that the defenders of a fortification would prefer a smooth glacis in front of their parapets, not permitting an attacker to approach under cover.

There were four city gates, the historians tell us. The mound formation of the inner peripheral wall in the right foreground of the photograph suspiciously resembles the contours of a gate construction. We may tentatively identify it with the south gate, Bab-i-Ardashir.⁷ None of the other exits are definitely marked. There are further depressions and irregularities of the wall ridge which may or may not have been gates.

Only seventeen hundred years have passed since the city of Ardashir I—thousands of homes, shops, barracks, and governmental buildings—throve in the apparent safety of its girdles of defense. The onslaught of the Arabs and Islam crushed in the 7th century the dynasty and the empire of the Sasanians. Their magnificent palaces turned into desolate ruins and their cities into mounds and fields leveled by the elements and by the peasants of later generations.

The crust above Gur is fertile ground, it seems. Except for its very center the ancient city is covered by the fields of present-day farmers, whose little, fortified villages are scattered within and around the circle of Ardashir's town. One solitary monument rises above its ruins. It has the appearance of an obelisk and stands exactly in the center of the circle. Its dominating position and height suggest some particular significance for this landmark of Gur. Traces of steep stairways are marked on the outside of the tapering pyramidal tower. It may well be that Marcel Dieulafoy and Flandin and Coste were right in assuming that it bore the sacred fire.

⁶ *Op. cit.* Pl. XIII.

⁷ Cf. G. Le Strange, *The Lands of the Eastern Caliphate* (Cambridge, Eng., 1905) pp. 255 f.

FAMOUS AND FORGOTTEN SPOTS IN THE SOUTH [21]

It is quite fascinating to study the vertical photograph (Pl. 19) of the core of the city of Gur. While most of the remaining area has been leveled in the course of the centuries, the city center shows an intricate maze of contours of houses and rooms, still elevated above the level of the environs. Again, we read that Gur had been built around an artificial mound.⁸ This fact may account for the elevation. At any rate it is logical to assume that here were the most important structures of religious and secular nature, grouped around the sacred tower. The aerial picture suggests, further, that this "governmental precinct" also was inclosed by a circular wall, concentric with the outer defense girdle.

There is a very large rectangular ruin to the left of the tower. If ground examination should prove its contemporaneousness with the original site, this building would be the most palatial structure of the city. Our doubt as to its age is raised by its form, which resembles that of certain Islamic caravanserais. A modern house with garden, protected by an outer inclosure, is seen to the upper left of the tower.

While the relief of this view would have been considerably more pronounced if taken in the fall, many of the structural contours would have been invisible. In reference to Istakhr we have explained that in spring the surface over buried walls is likely to show less vegetation than do the surrounding areas. Thus the contrast of colors, tan and green, shown light and dark on the Aeropan film, often marks contours though relief may be absent.

The vertical view above described is one of a strip of four taken while we were flying diametrically across the city circle. They are intended to aid future excavators in planning their operations at this important site.

THE SASANIAN PALACE OF SARVISTAN

Flandin and Coste⁹ and Marcel Dieulafoy¹⁰ have dealt with the structural details preserved in the remains of the Sarvistan palace, which Herzfeld tentatively attributes to the time of Bahram (V) Gur (A.D. 420-40).¹¹

Archeological field men will be fascinated by the relief (seen on Pls. 20-21) of the ground inclosing the building, whose typical Sasanian domes have been punctured by the elements. The steep oblique and the vertical show the plan of an entire settlement once attached to the princely palace. The rectangular courtyard inclosing the palace is clearly marked. The entrances to the court are indicated by gaps in the wall contours. Long rectangular sections, walled-in gardens, adjoin the palace and the cluster of houses. The ruins of the domestic quarters are sharply offset

⁸ *Ibid.* p. 255.

¹⁰ *Op. cit.* IV 1-29.

⁹ *Voyage en Perse* II 374-77.

¹¹ Sarre and Herzfeld, *Iranische Felsreliefs*, p. 131.

from the flat, drab brown alluvial plain, a formation ideal for aerial observations. In the background of Plate 20 a ruin of doubtful antiquity is visible. It is a compound of two large courts, one of them inclosing a citadel mound.¹²

QASR-I-ABU NASR NEAR SHIRAZ

Joseph M. Upton, Walter Hauser, and Charles K. Wilkinson carried through the neat and clear-cut excavations at this site for the Metropolitan Museum of Art in New York. They will be able to point out many features of interest in Plate 22 (see also cover design) when dealing with the site in their final publication.¹³ The vertical photograph shows the network of buildings uncovered on the citadel knoll which surmounts the site. Trenches tested the interior of the town, while narrow channels defined the course of the town wall. The excavators found beautiful Sasanian seal impressions and seals and many other objects of the Sasanian and Early Islamic periods.

SASANIAN SHAPUR

In 1935 Roman Ghirshman started excavations in this town of Shapur I (A.D. 240–71) for the Paris Louvre.¹⁴ The excavations and the expedition house are shown just left of the center of Plate 23, while farther to the left, across the highway, the citadel of the ancient town rises on a rocky spur. From the fortress a road leads to the left and passes some famous reliefs.¹⁵ The aerial picture records only a part of the extensive town site. A deep and broad moat limits the ruin area at the upper edge of the view, while the winding river in the lower center seems to form the opposite boundary. Only the most pronounced structural debris rises above the surrounding territory, darkened and flattened on the photograph by the green growth of spring.

BAND-I-AMIR

Plate 24 is as interesting for an agriculturist as for an archeologist. It shows the head of an irrigation system which owes its origin to an enlightened Buwaihid prince, ‘Adud-al-Daulah, who

¹² In 1937 we landed near the palace and gathered characteristic sherds of the Sasanian period in the palace complex. We had intended to publish drawings and descriptions of these and other sherds gathered during our landings, but the drawings were lost when mailed to the United States in August, 1939.

¹³ Their preliminary report, "The Persian Expedition, 1933–1934," appeared as Section II of the *Bulletin of the Metropolitan Museum of Art* for December, 1934.

¹⁴ See preliminary reports by Georges Salles and Roman Ghirshman in *Revue des arts asiatiques* X (1936) 117–29 and XII (1938) 12–19.

¹⁵ Last described by Sarre and Herzfeld, *Iranische Felsreliefs*, pp. 213–23.

FAMOUS AND FORGOTTEN SPOTS IN THE SOUTH [23]

during the second half of the 10th century after Christ built the dam to raise the water of the Kur River, below its junction with the Pulvar.

Le Strange narrates that this “Dam of the Amir” or ‘Adudi Dam was considered one of the wonders of the province of Fars. Ten great water wheels raised the water to such a high level that three hundred villages could be supplied with the water, so precious in Iran; and at each wheel there was a flour mill.¹⁶ The dam is still raising the water of the river, which has now adopted the name of the former, Band-i-Amir; and many villages of the Marv Dasht still have reason to be thankful to the Buwaihīd amir.

¹⁶ Le Strange, *op. cit.* p. 277.

*PLATES 1-24 * SOUTHERN IRAN*

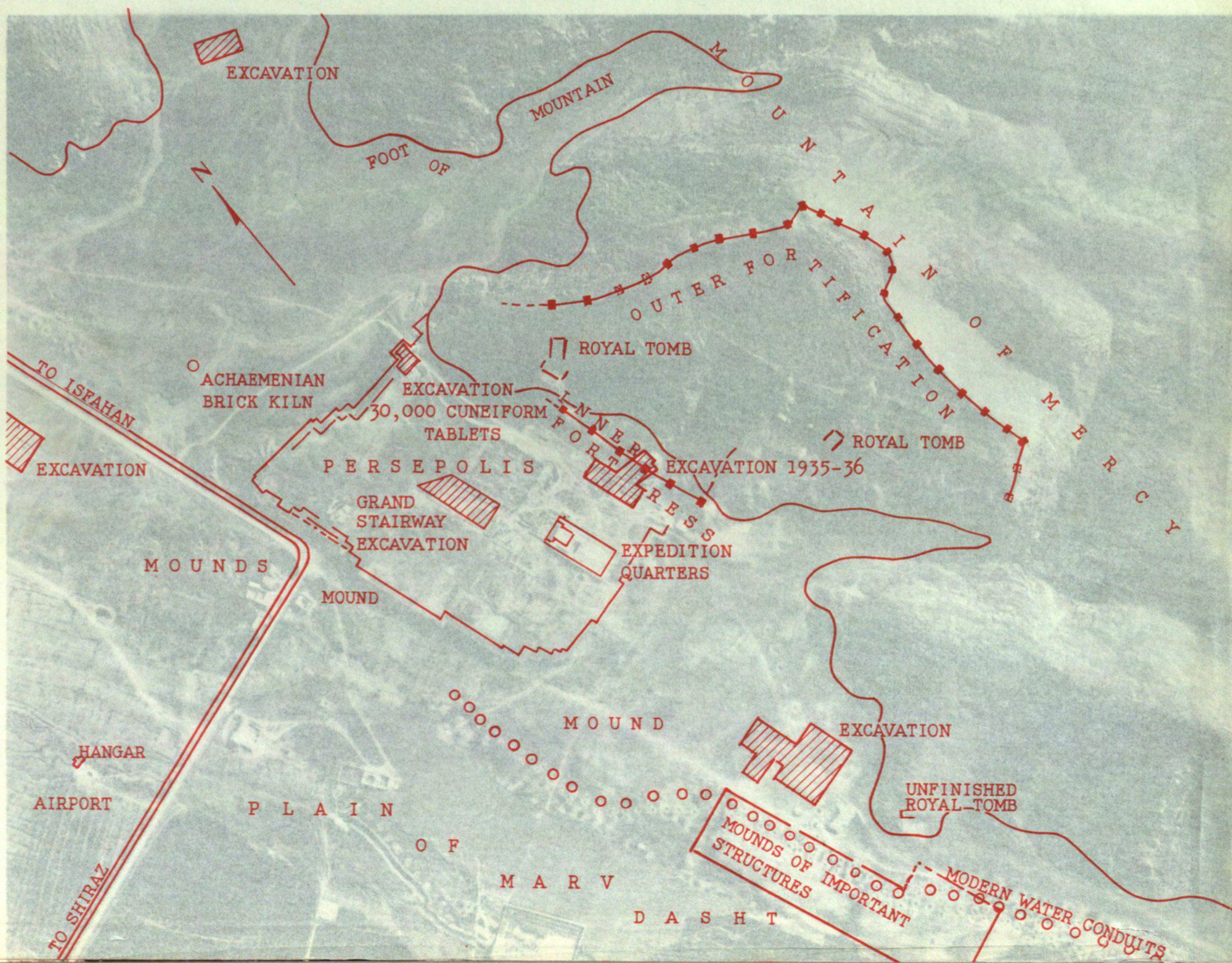


OBLIQUE AIR VIEW OF PERSEPOLIS

Beyond the palaces destroyed by Alexander the Great rises Kuh-i-Rahmat, the "Mountain of Mercy." The expedition house, which is the restored Harem of Xerxes, and some of the excavations of 1935-36 are seen at the right-hand corner of the Terrace. (*May 20, 1936; 8:07 A.M.; altitude, 200 meters; 1/100 sec.; filter A [weak]; direction of view, approximately NE.*)

VERTICAL VIEW OF THE SITE OF PERSEPOLIS

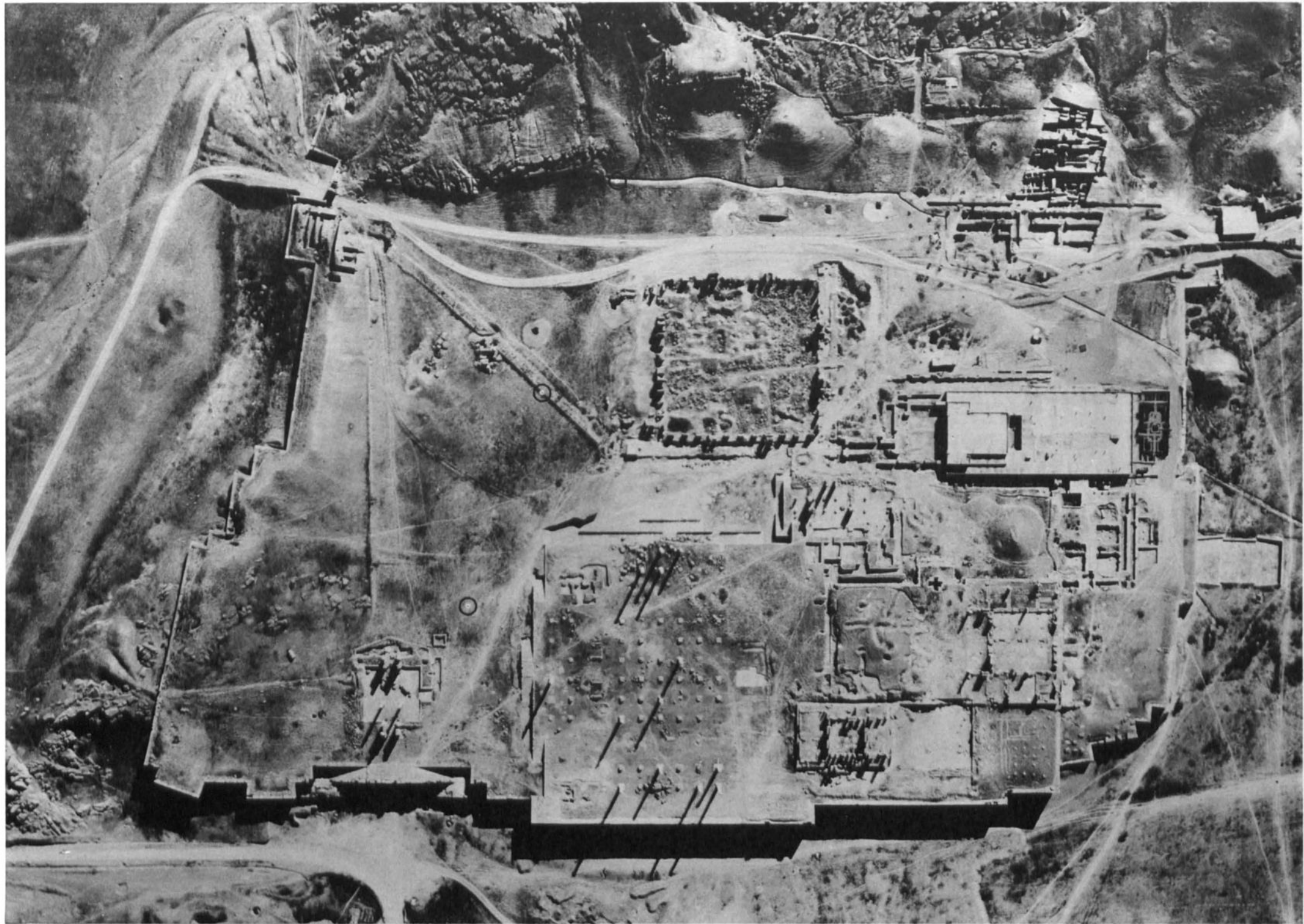
In the form of a plastic map the system of fortifications with its towers, the complex of palaces, and the physical environs of the royal site are spread below. (April 20, 1936; 7:39 A.M.; altitude, 2,440 meters; 1/100 sec.; no filter.)



VERTICAL VIEW OF THE SITE OF PERSEPOLIS

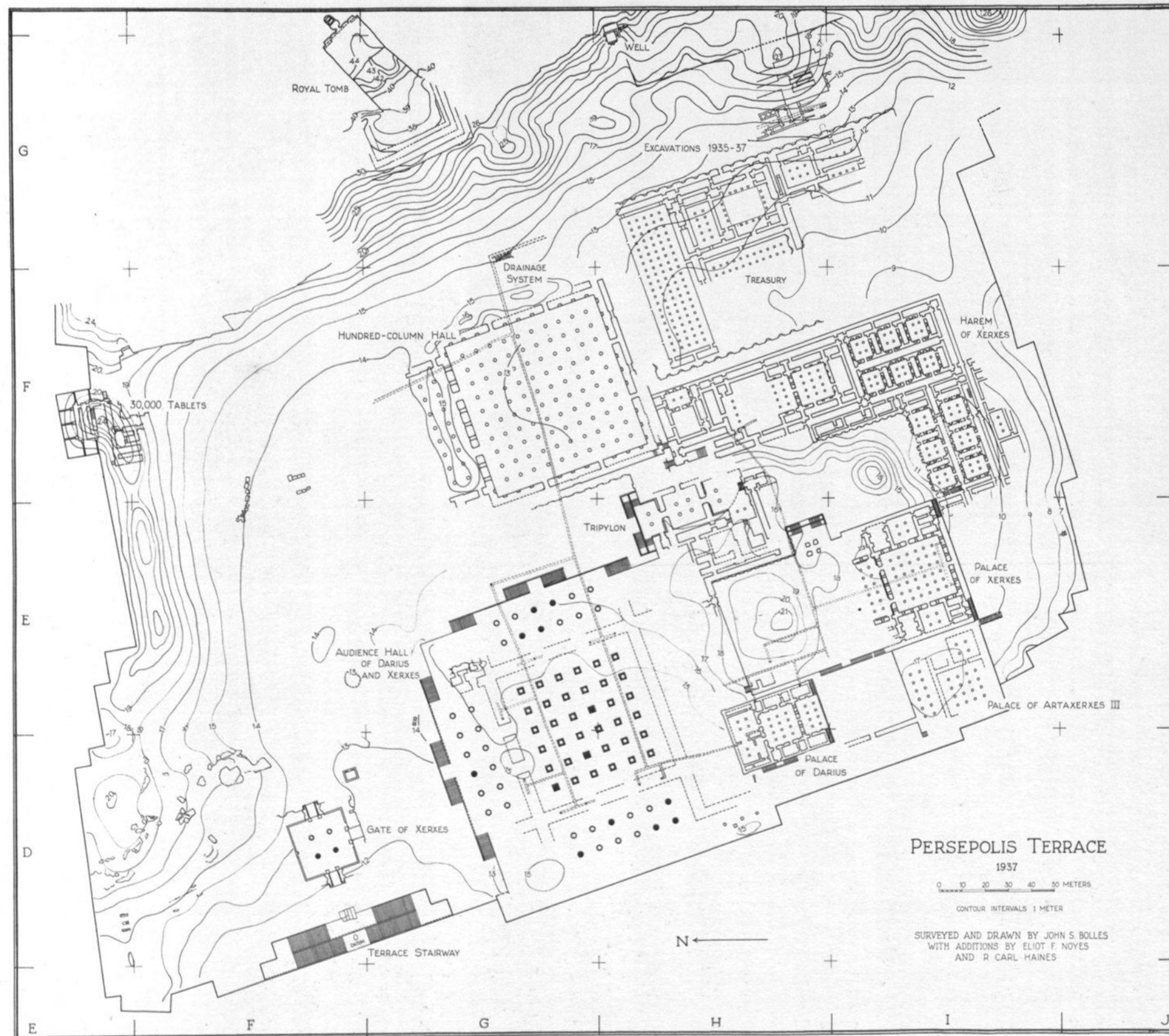
In the form of a plastic map the system of fortifications with its towers, the complex of palaces, and the physical environs of the royal site are spread below. (*April 20, 1936; 7:39 A.M.; altitude, 2,440 meters; 1/100 sec.; no filter.*)





VERTICAL VIEW OF THE TERRACE OF PERSEPOLIS

The surface relief, artificial and natural, is well indicated on the aerial photograph, while the following drafted plan shows the architectural remains more clearly. (April 20, 1936; 8:09 A.M.; altitude, 1,068 meters; 1/100 sec.; no filter.)



DRAFTED PLAN OF THE PERSEPOLIS TERRACE

Where structural remains are present the ground survey must always supplement the aerial view.

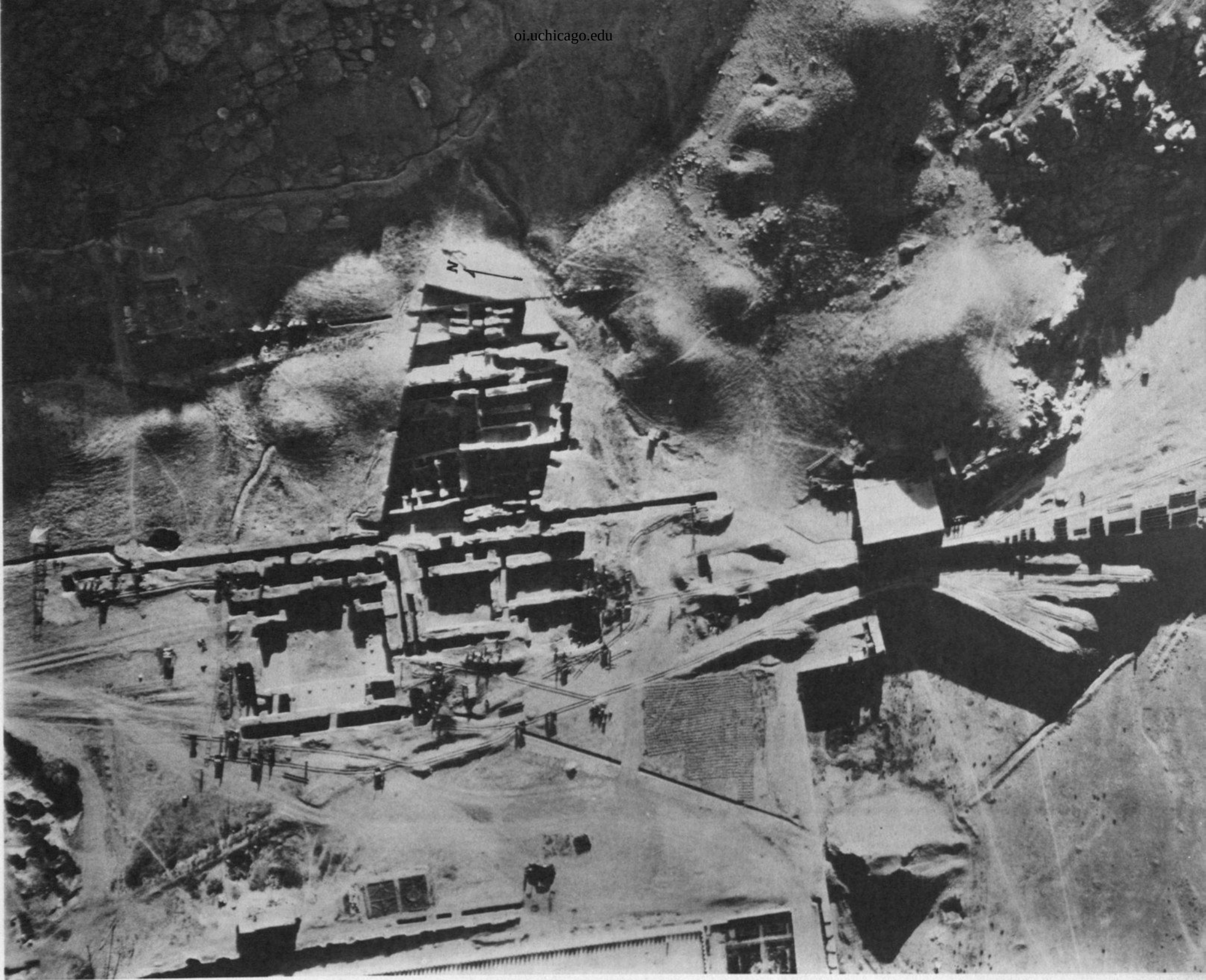
PLATE 5

A. VERTICAL VIEW OF THE PERSEPOLIS EXCAVATIONS OF 1935-36

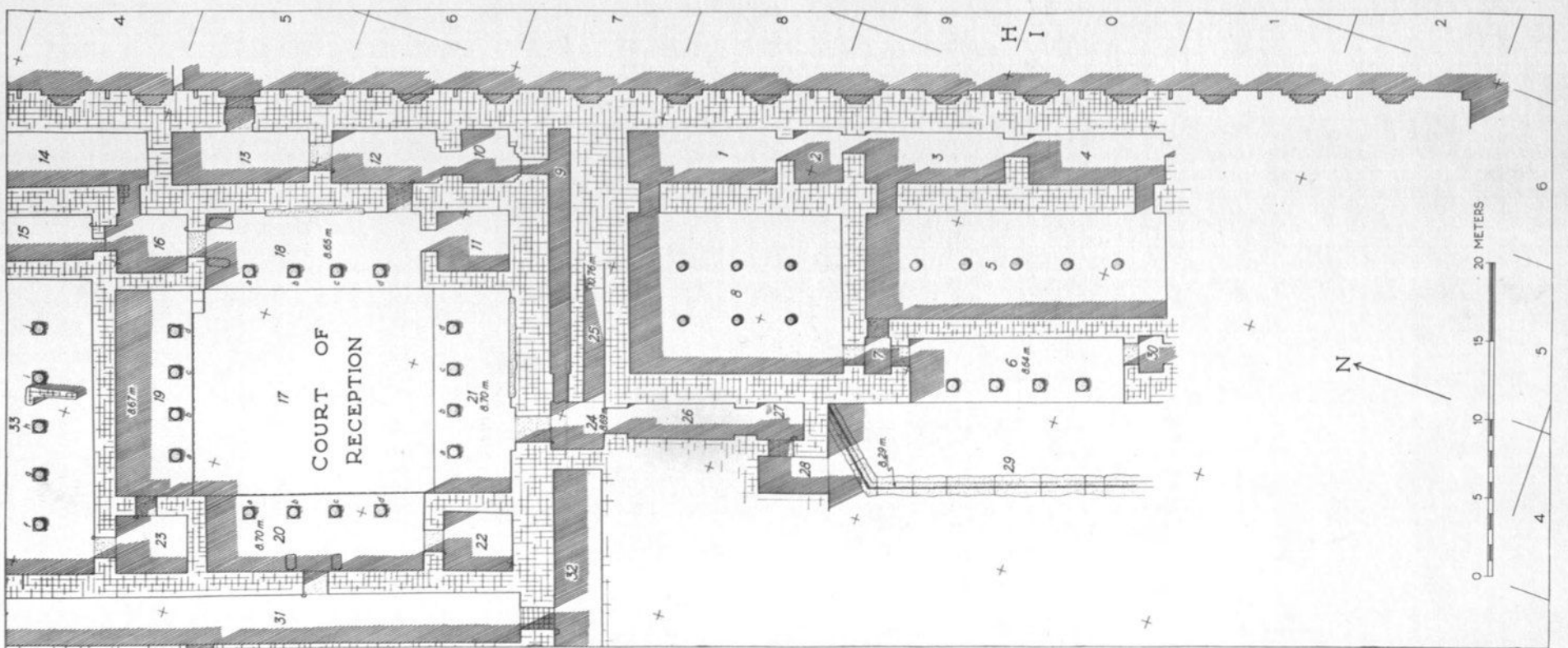
The aerial photograph gives an unretouched view of the excavations in their topographic environment. The system of dirt removal is shown by the railroad tracks and dump piles. The delicate network at the Terrace edge is the potsherd yard, while at the lower margin of the picture a corner of the expedition's quarters is visible. (*May 8, 1936; 6:46 A.M.; altitude, 460 meters; 1/250 sec.; no filter.*)

B. DRAFTED PLAN OF PART OF THE PERSEPOLIS EXCAVATIONS OF 1935-36

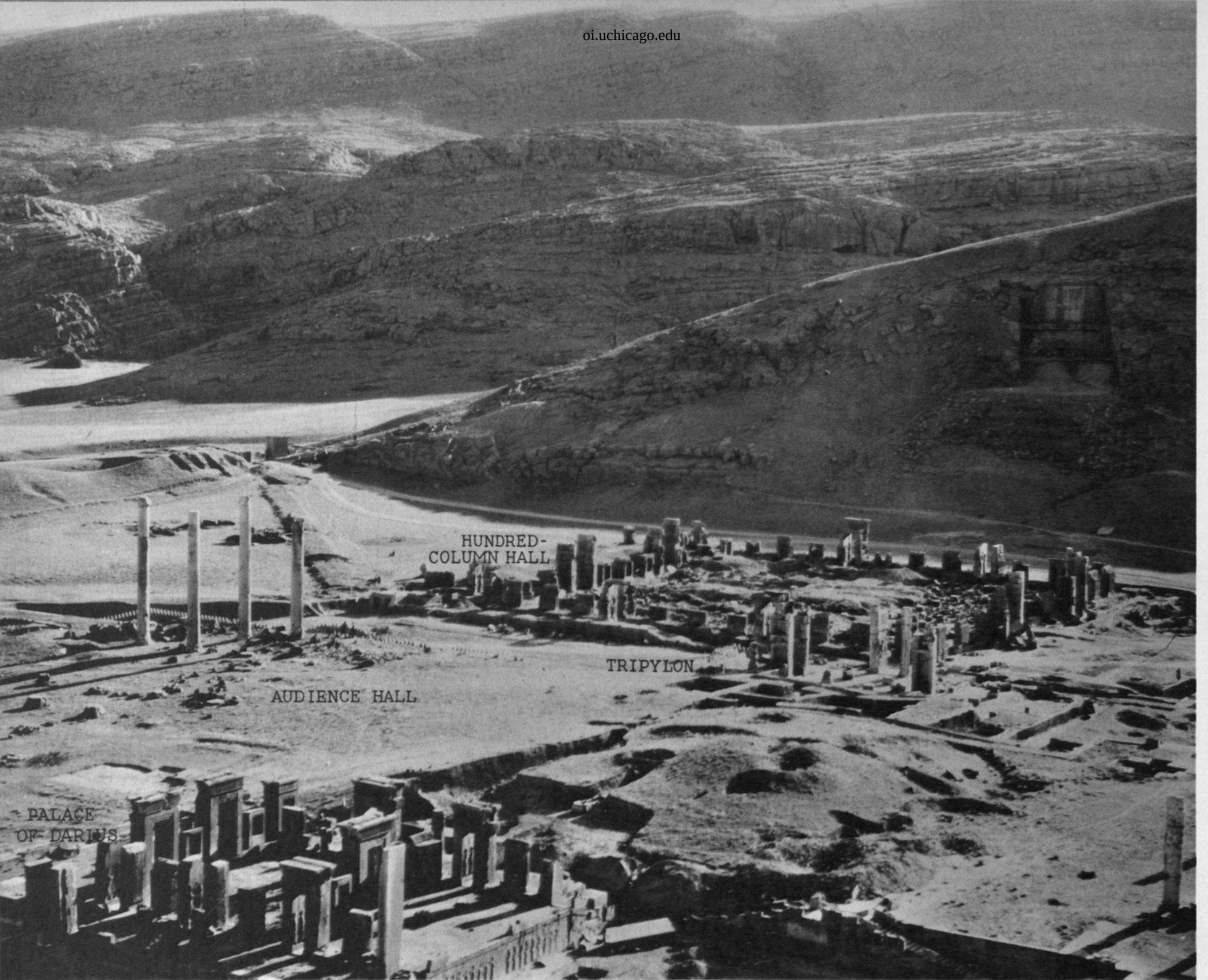
Again it becomes clear, on comparison of *A* with *B*, that the survey is an essential supplement to the air photograph for the recording of excavated structures.



A



B



OBLIQUE VIEW OF SOME PERSEPOLIS PALACES

In the foreground are the ruins of the beautiful palace of Darius. Beyond rise the columns of the Audience Hall of Darius and Xerxes, while in the right center the debris of the Hundred-Column Hall appears behind the three gateways of the Tripylon. A royal tomb is cut into the rock slope of the "Mountain of Mercy." (May 8, 1936; 6:40 A.M.; altitude, 50 meters; 1/250 sec.; no filter.)

THE EXCAVATIONS ON THE TERRACE OF PERSEPOLIS

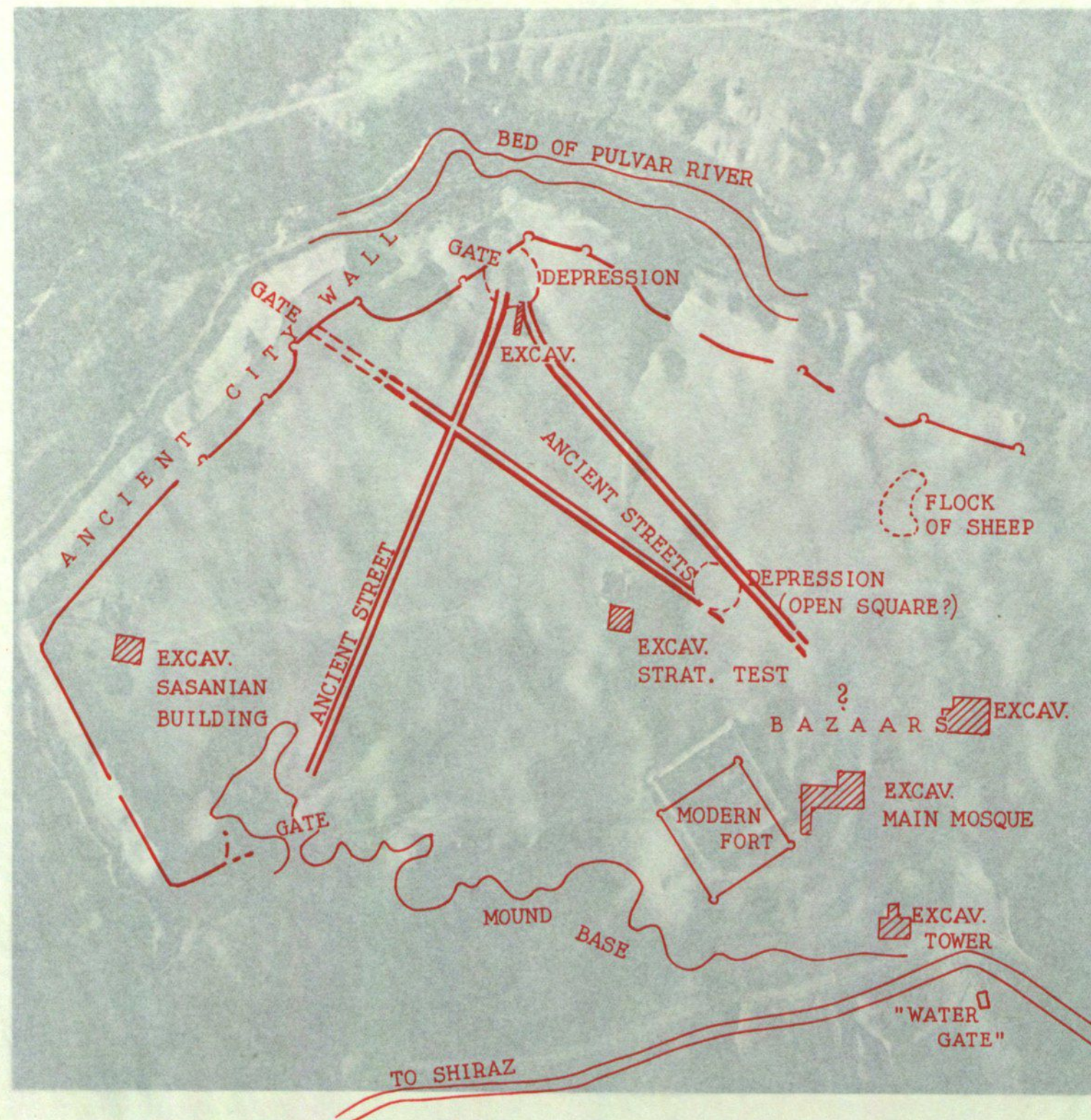
At the far end of an excavated courtyard one of the newly discovered reliefs of Darius holding audience ornaments the wall of a portico. In the background is the restored Harem of Xerxes, forming the spacious quarters of the expedition. The plain called Marv Dasht extends beyond the edge of the Terrace.





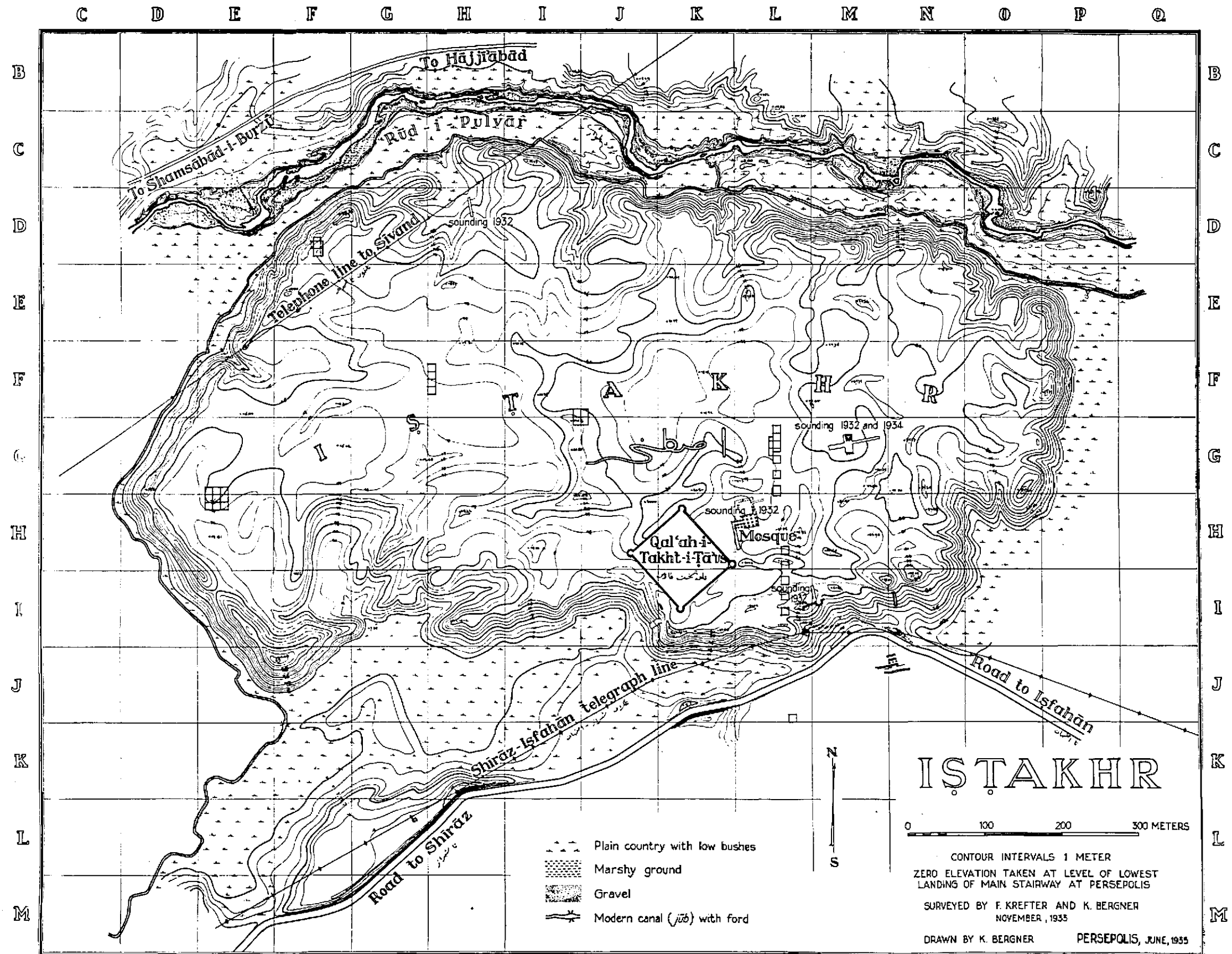
THE CITY MOUND OF ISTAKHR, NEAR PERSEPOLIS

The faint straight depressions crossing the mound are buried thoroughfares of the Islamic city which ceased to exist more than nine hundred years ago. The sites of three city gates are determined by the ends of the streets, where they abut the outer inclosure. (September 26, 1935; P.M.; altitude, 1,525 meters.)



THE CITY MOUND OF ISTAKHR, NEAR PERSEPOLIS

The faint straight depressions crossing the mound are buried thoroughfares of the Islamic city which ceased to exist more than nine hundred years ago. The sites of three city gates are determined by the ends of the streets, where they abut the outer inclosure. (September 26, 1935; P.M.; altitude, 1,525 meters.)



DRAFTED MAP OF THE MOUND OF ISTAKHR

The following air map shows that the considerable sum spent in making this line-drawn map could have been saved. Plates 8 and 10 combined give considerably more detail of value to the excavator than does the ground survey.



AIR MAP OF ISTAKHR

The results of our analysis are marked in red lines: the city defense with its towers, the main thoroughfares and lanes, and the traces of buildings.

This view shows the tremendous advantage over the drafted map of the aerial photograph with fixed ground points, if taken under favorable conditions. On the photograph the fixed points are connected by white lines. (*April 20, 1936; 7:28 A.M.; altitude, 2,440 meters; 1/100 sec.; no filter.*)



A

B



A. AIR MAP OF NAQSH-I-RUSTAM

(May 8, 1936; 6:01 A.M.; altitude, 991 meters; 1/250 sec.; no filter.)

B. AIR MAP OF NAQSH-I-RUSTAM AFTER START OF EXCAVATIONS

These two views show the application of the vertical photograph as an excavation map. Part of the grid marked on *A* is seen on *B* after excavation. The large square marked on *A* measures 100×100 meters. A cluster of laborers appears on *B* beside the Ka'bah-i-Zardusht, where important Sasanian inscriptions were discovered. *(June 4, 1936; 5:45 A.M.; altitude, 533 meters; 1/100 sec.; no filter.)*



NAQSH-I-RUSTAM, THE BURIAL PLACE OF ACHAEMENIAN KINGS

The royal tombs are cruciform cuts in the vertical cliff, while the Ka'bah-i-Zardusht is the rectangular construction in front. On the central table mountain at the horizon, called "Istakhr Mountain" (Kuh-i-Istakhr), the people of Istakhr found refuge in time of distress. (*May 8, 1936; 6:06 A.M.; altitude, 91 meters; 1/250 sec.; no filter.*)

PLATE 13

TWO PREHISTORIC MOUNDS SOUTH OF PERSEPOLIS

Parts of a town of six thousand years ago were previously excavated in the mound to the left. The white survey points, 100 meters apart, were staked in preparation for further soundings. The ruins of a town of historical times are at the bottom of the picture. (*April 22, 1936; 6:43 A.M.; altitude, 1,220 meters; 1/100 sec.; no filter.*)

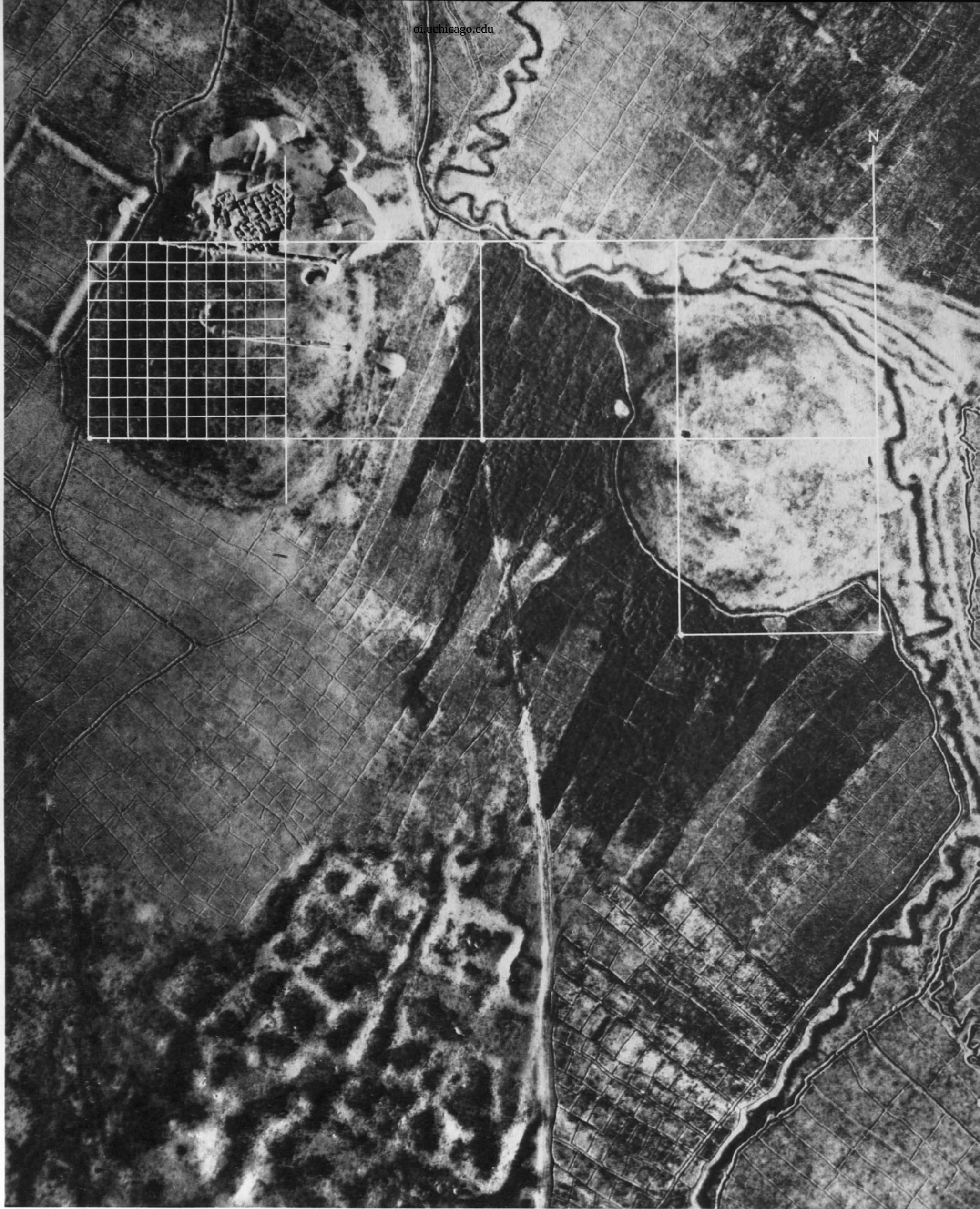


PLATE 14



A. THE TOMB OF CYRUS THE GREAT AT PASARGADAE

The soldiers of Alexander the Great rifled the tomb of the founder of the Achaemenian dynasty. It is a terraced pyramid of stone carrying the actual burial place in the shape of a small house. (September 28, 1935; 7:06 A.M.; altitude, 214 meters; 1/140 sec.; yellow filter [medium].)



B. VERTICAL VIEW OF CYRUS' TOMB

The map view clearly shows the rectangular area, inclosing the tomb of the king, and rows of broken columns added during the Islamic period. Hundreds of Muslim graves surround the pyramid, which has become a sacred spot of Islam. (May 9, 1936; 6:01 A.M.; altitude, 1,220 meters; 1/250 sec.; no filter.)



THE PLATFORM OF PASARGADAE

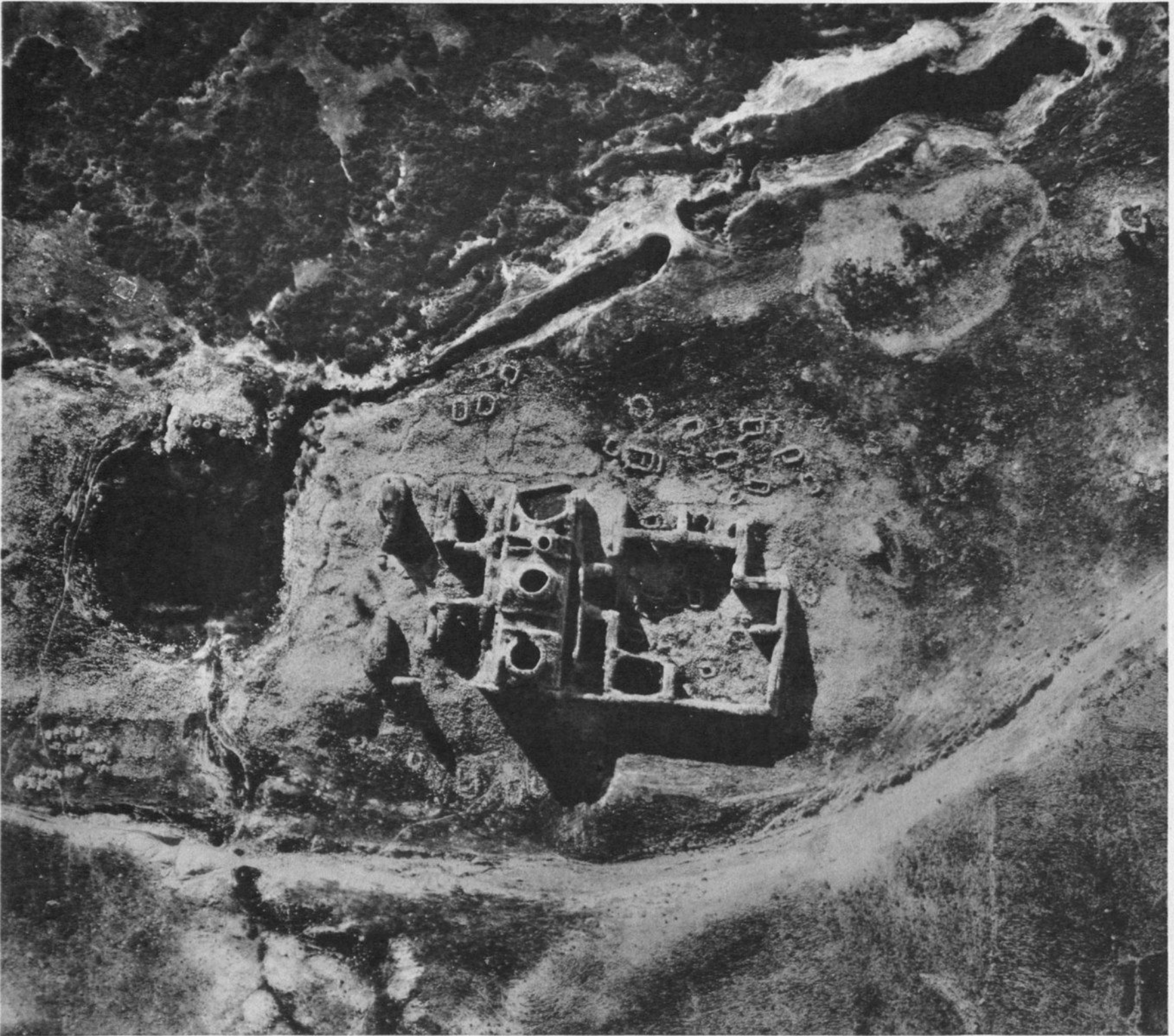
Neither we nor others who had previously walked across the site of Pasargadae had ever noticed the polygonal fortification wall so clearly marked on this vertical photograph. It may form a clue for important remains once protected by the inclosure but invisible even in this air view. (*September 28, 1935; 6:52 A.M.; altitude, 2,196 meters; 1/140 sec.; yellow filter.*)

PLATE 16



THE SASANIAN PALACE OF FIRUZABAD NEAR ANCIENT GUR. OBLIQUE VIEW

(March 30, 1936; 8:08 A.M.; altitude, 488 meters; 1/250 sec.; no filter.)



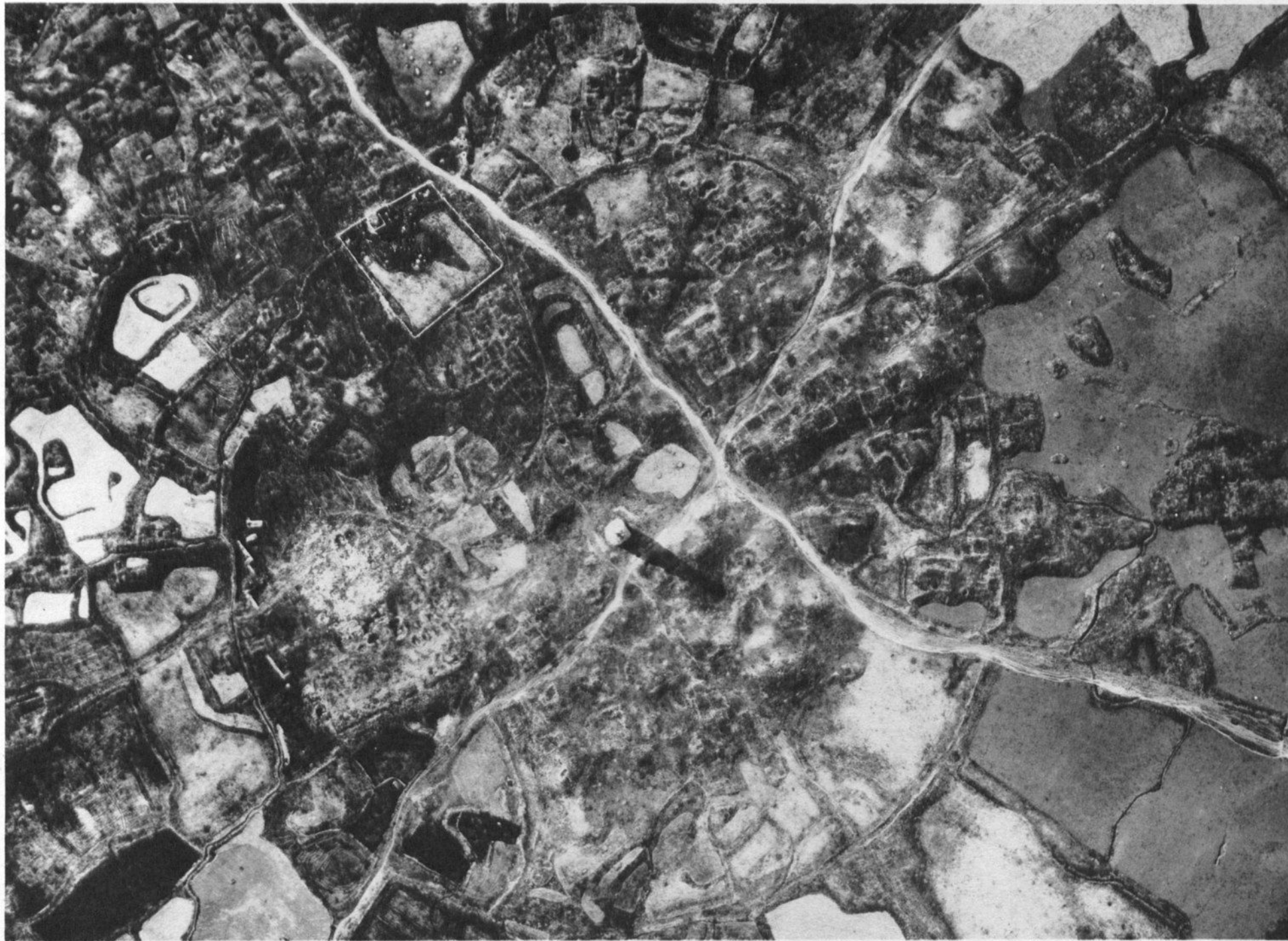
THE SASANIAN PALACE OF FIRUZABAD. VERTICAL VIEW

Students of Sasanian architecture will welcome the documentation of this famous structure by air views supplementing ground pictures. (March 30, 1936; 7:45 A.M.; altitude, 305 meters; 1/250 sec.; no filter.)



THE SITE OF THE SASANIAN CITY OF GUR IN THE VALLEY OF MODERN FIRUZABAD

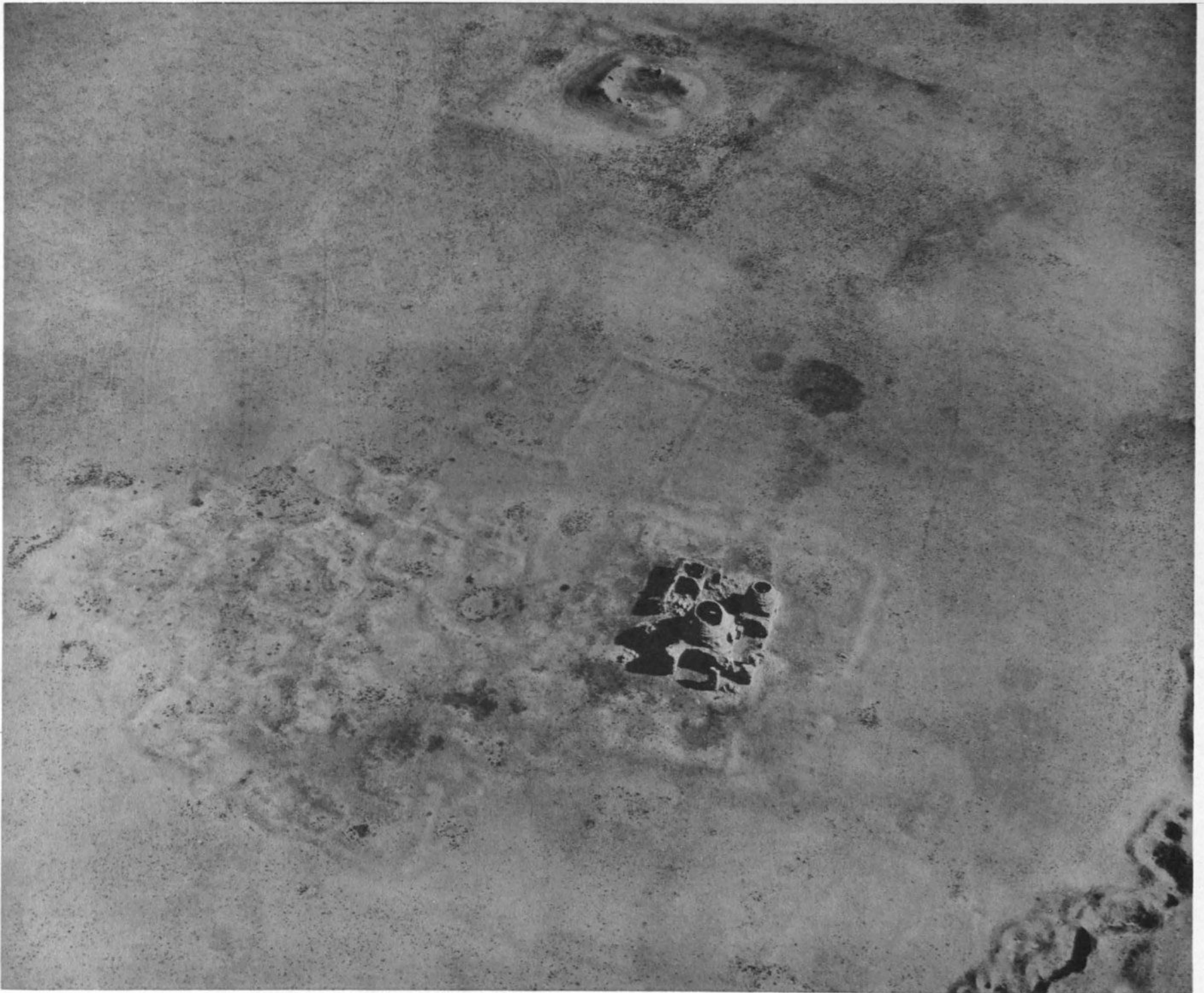
In defiance of the ruling Parthian dynasty, Ardashir I built here the capital from which he spread his empire. The circular city defense, about three-quarters of a mile in diameter, is interrupted at lower right by a gate formation, while in the center of the circle the remains of an assumed tower for the eternal fire form the only construction now left above ground. (March 30, 1936; 8:02 A.M.; altitude, 854 meters; 1/250 sec.; no filter; direction of view, approximately NE.)



THE CENTER OF THE CITY OF GUR. VERTICAL VIEW

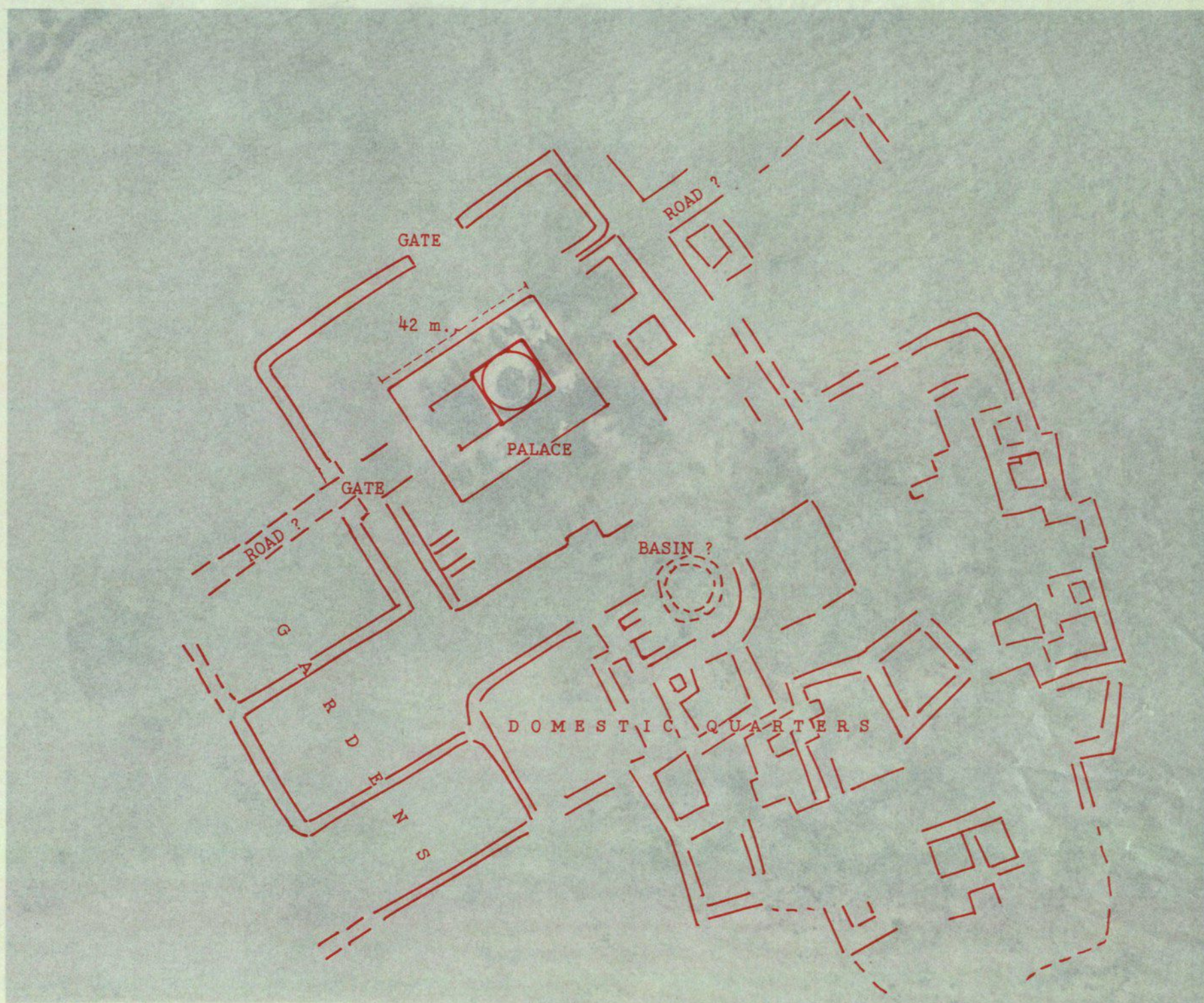
While most of the ancient city dwellings have sunk below the present surface, mound formations in the inner circle of Gur indicate the former existence of important constructions grouped around the fire tower. Even the contours of houses and rooms are marked by lighter tints caused by the absence of vegetation on top of the ancient walls. (March 30, 1936; 7:58 A.M.; altitude, 824 meters; 1/250 sec.; no filter.)

PLATE 20



OBLIQUE VIEW OF THE SASANIAN PALACE NEAR SARVISTAN

(March 30, 1936; 8:49 A.M.; altitude, 427 meters; 1/250 sec.)



VERTICAL VIEW OF THE SASANIAN PALACE NEAR SARVISTAN

The alluvial plain is ideal for aerial photography of ancient remains. The entire palace complex with the contours of palace inclosure, gardens, and adjacent settlement is well marked on both Plate 20 and Plate 21. The former shows in addition a citadel formation of doubtful age near the upper edge of the picture. (March 30, 1936; 9:00 A.M.; altitude, 488 meters; 1/250 in.)



VERTICAL VIEW OF THE SASANIAN PALACE NEAR SARVISTAN

The alluvial plain is ideal for aerial photography of ancient remains. The entire palace complex with the contours of palace inclosure, gardens, and adjacent settlement is well marked on both Plate 20 and Plate 21. The former shows in addition a citadel formation of doubtful age near the upper edge of the picture. (March 30, 1936; 9:00 A.M.; altitude, 488 meters; 1/250 sec.)





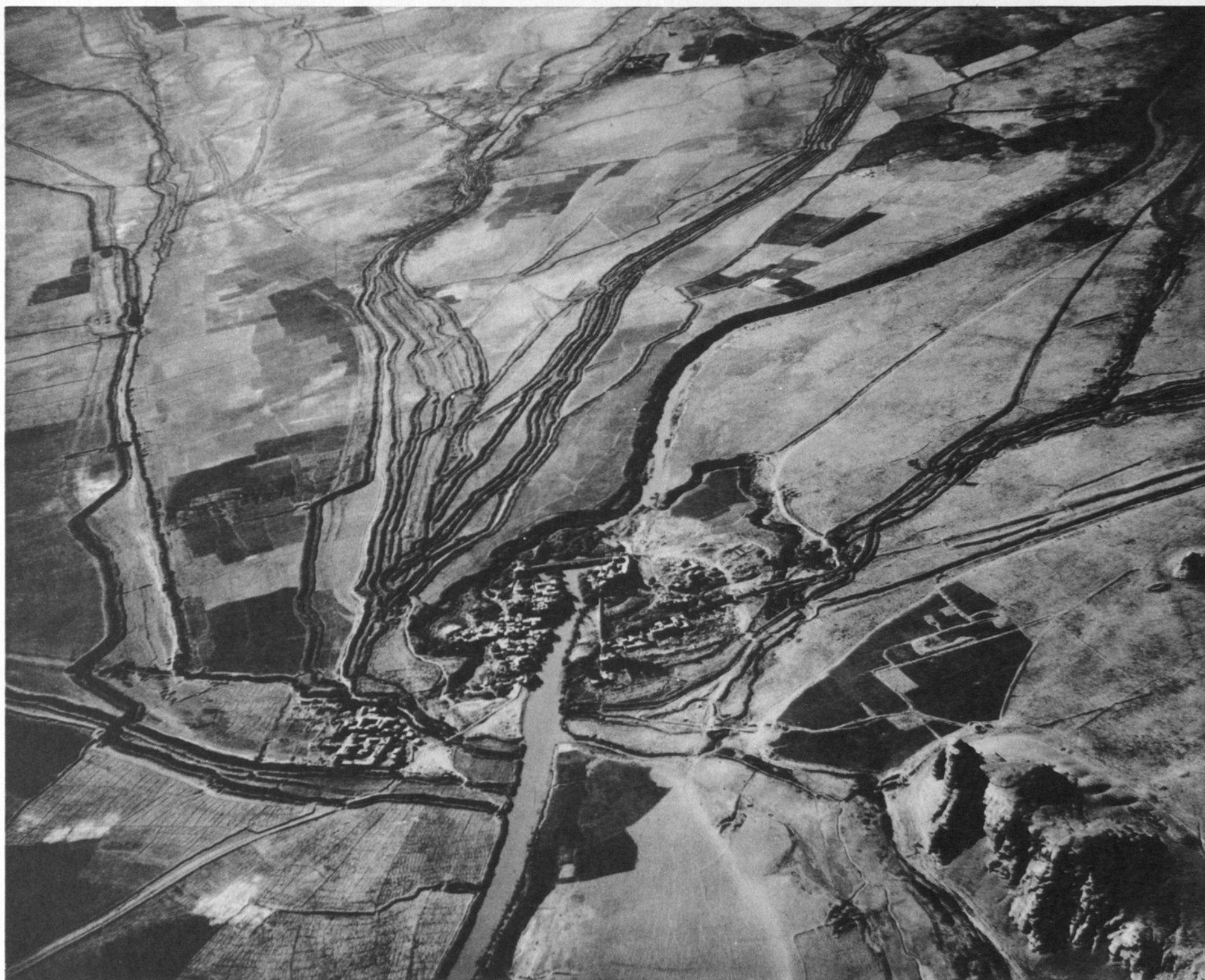
THE SITE OF THE SASANIAN CITY OF SHAPUR

The vegetation of spring disturbs the relief of this map view. However, the most important constructions appear in the form of light-colored clusters. The excavations of a French expedition are marked in the center of the picture. (*April 2, 1936; 8:36 A.M.; altitude, 2,440 meters; 1/250 sec.; no filter.*)

THE SITE OF QASR-I-ABU NASR NEAR SHIRAZ

The vertical map view shows the neat excavations of the Metropolitan Museum of Art. The most prominent knoll was entirely excavated, while trenches follow the city inclosure. Sasanian tumuli dot the environs. (*March 30, 1936; 7:06 A.M.; altitude, 1,220 meters; 1/250 sec.; no filter.*)

PLATE 24



*BAND-I-AMIR, THE HEAD OF AN OLD IRRIGATION SYSTEM
IN THE MARV DASHT*

It is interesting to observe some irrigation canals still in use and others discontinued and marked more faintly. The original dam was constructed more than nine hundred years ago.
(September 27, 1935; 7:33 A.M.; altitude, 915 meters; 1/140 sec.; yellow filter.)

COMMUTING BETWEEN RAYY AND PERSEPOLIS

FOURTEEN times in 1935 and 1936 we flew between the two main centers of our excavations, gaining more than twenty days of active work instead of spending them on the road. In four to four and a quarter hours we traversed the distance from Rayy to Persepolis and vice versa, as against two days of tedious driving by car, including an overnight stay at Isfahan. As a rule we took off in the twilight of dawn. While we climbed for altitude above peacefully sleeping Tehran the rays of the rising sun would strike the Elburz Mountains, whose massive snow-capped summits offered in spring a spectacle of exquisite beauty; and at Persepolis we shall never forget the gold-flooded "Mountain of Mercy" and the table rocks to the northwest emerging from the ground haze of the Marv Dasht. There are many moments in the airman's life such as are rarely given to his earth-bound fellow-men.

Our usual route from Tehran to Persepolis touches the eastern shore of the roughly oval western portion of the Darya-yi-Namak ("Salt Lake") of Qumm, which is all that is left during the dry season and is much smaller than the body of water indicated on the maps. Caravan tracks run across the dry portion to the east. We pass Qumm, an oblong town cluster of houses, brightened by the golden domes of the shrine of Fatimah, sister of Imam Riza, the eighth Imam, whose sanctuary is in Mashhad. A mosaic of green and tan cultivation surrounds the town.

Dalijan, a patch of drab brown houses, and the villages along the Qumm River are left to the right. We fly across the tan alluvial plains spreading southward, now and then dotted with oases—a cluster of mud houses, splashes of green, and filigree of fields. To the east, beyond a high mountain range, lie Kashan and, farther on, the lifeless Dasht-i-Kavir, the "Salt Desert."

Midway between Tehran and Persepolis is Isfahan, the famous capital of Shah 'Abbas, one of the largest and the most beautiful of Iranian towns, to which we devote a special section below. Isfahan-Persepolis is the more difficult leg of the flight. We pass Shah Riza, formerly Qumishah, encircled by an old town wall. Three conoid towers on top of a rocky hill east of town form its landmark. We were told that they had been built as a charm against locust plagues (and had helped). Splitting an alluvial plain, the canyon of Yazd-i-Khast appears next. From above, it is a green gash in the drab brown desert. The canyon bottom is densely cultivated, and on a vertical

table rock, like an island, rests the strange village of Yazd-i-Khast, picturesque and well protected in former times by its natural position.

High ranges seem to block the direct route from Yazd-i-Khast to Persepolis. We climb to almost 14,000 feet to clear the mountains—only 2,000 feet below the “ceiling” of our ship, as we found out on another occasion. The flight from Yazd-i-Khast to Persepolis takes about one and a half hours, much of the time over rough country with few possibilities for emergency landings. However, Luristan is rougher, as we shall see. Far to the west of our course a range of eternally snow-clad mountains, 15,000 to 17,000 feet high, rises above the alpine landscape. The table rocks near Persepolis are our next landmark. Soon we drone above the villages and fields of the Marv Dasht, and a smoky fire guides the pilot to his always perfect landing below the terrace and palaces of the Achaemenian kings.

AIR VIEWS OF BEAUTIFUL ISFAHAN

When commuting between the two centers of our ground work we rarely missed circling above the lovely oasis of Isfahan, fascinated by its turquoise-blue domes which seem to reflect the clear sky of Iran.¹ At times we landed and went to the palatial structures of the Safavids or wandered through the long bazaar where modern artisans still try to perpetuate the handicrafts of their more skilful predecessors.

An oblique view, Plate 25, shows the most interesting part of Isfahan, the Maidan-i-Shah (“King’s Square”), and some of its surrounding buildings. Plate 26 gives the map view of this area. The Maidan, 560 yards long, is dominated by the most impressive structure of the town, the Masjid-i-Shah (“Mosque of the Shah”). The Mosque of Shaikh Lutfu’llah in the east, on the opposite side the royal pavilion of ‘Ali Qapu, and the *naqārah khānah* (“drum house”) at the entrance to the bazaar in the north are the other important buildings of this impressive city center, which is at present being restored by the Iranian government under the expert guidance of M. André Godard, the director of the Service of Antiquities.

The vertical view of the Masjid-i-Jum‘ah (“Friday Mosque”) shown on Plate 27 was put at the disposition of M. Godard and Mr. Myron Bement Smith. Both have spent much effort in studying this architecturally important structure. Mr. Smith and his staff spent two years in making an accurate survey, intricate because of the presence of several building periods. On the photograph the mosque complex fills most of the lower left corner, while the curious line of “blisters” running from the mosque to the right edge of the picture is a bazaar road with a roof

¹ In George N. Curzon’s *Persia and the Persian Question* II 19 ff. the history of Isfahan is given, and its important buildings are described. In the monumental publication, *A Survey of Persian Art from Prehistoric Times to the Present*, edited by Arthur Upham Pope (6 vols.; London and New York, 1938–39), the reader will find splendid illustrations of structures referred to in relation to our flights, together with descriptions by competent scholars. Isfahan is represented in Vols. II and IV.

COMMUTING BETWEEN RAYY AND PERSEPOLIS [27]

of little domes. A modern street opening this part of the town to motor traffic cuts through the old, irregular blocks of houses.

Strange ruins are perched on the apex of a conoid rock (Pl. 28) situated a few miles west of Isfahan. The pavilion on the summit is an Islamic structure, while the fortifications on the slope are of earlier date. A. V. Williams Jackson describes this "Hill of the Fire Temple" in his *Persia Past and Present* (New York, 1909) pages 252–61.

HAVAH, SAVAH, AND KASHAN, POINTS OF ARCHEOLOGICAL INTEREST

On two occasions we drifted westward, when flying from Persepolis to Tehran, and crossed the extremely interesting valley of Savah, abounding in ancient remains. The largest compact mound in the drainage basin of the Qara Chay ("Black River"), which includes the Savah area, is a site near Havah, a vertical view of which is shown as Plate 29. We do not know accurately its height and extent. The main mound, appearing on the photograph like a truncated conoid cake, may be about 20 meters high and perhaps 100 meters in diameter. Six millennia of occupation may have been required to accumulate this hill. There is hardly a doubt that prehistoric settlements form its base. As a matter of fact, one of the earliest types of ceramics occurring at Rayy—a black-on-red ware dating from the first half of the 4th millennium B.C.—has been found in the Savah–Havah plain.

A clearly marked fortification incloses an area attached to the principal elevation. It is possible that governmental buildings were thus protected during one or several periods of its occupation. On the photograph the rough relief of the environs above, below, and to the right of the hill indicates a town deposit, also marked by small defense inclosures. A town wall plainly limits the occupied area above and somewhat to the left of the main mound. Holes excavated by illicit diggers pockmark the town site, and a few small craters show their scratchings on top of the hill. This Havah Tepe has the appearance of a focal site which would certainly repay the scientific excavator with important information.

The old mosque of Savah with the stump of a fallen minaret at its lower left corner (Pl. 30) is situated at the edge of the little town in a no man's land of "shell holes" produced by hunters of treasure and pots. The unusually concentrated efforts of the pot-diggers were due to the archeological fertility of the Savah soil in the famous ceramics of the Seljuks. In most cases the precious vessels of the *mīnā'ī* style, painted with enamels in miniature fashion, and others with metallic luster or with delicate monochrome glazes cannot be distinguished from the wares of Rayy, the Seljuk capital of Iran. This means that Savah was just as important a ceramic center as the capital, and at times one is even inclined to think that Savah exported vessels to the town of greater fame. To judge by the looks of the ground from the air, scientific data would be hard to

obtain. Yet there may be spots less disturbed or even untouched. Such points could yield interesting material for comparison with other ceramic centers.

Kashan is an important point for Iranian archeology. It has long been famous for its manufacture of ceramics during the Islamic period; but during recent years it has also turned into a key site of prehistoric Iran. Near its outskirts, at Tepe Siyalk, Roman Ghirshman discovered a proto-Elamite stratum, decisively important for the dating of the early prehistoric cultures of Iran.² The position of the proto-Elamite stratum, dating about 3000 B.C. or somewhat later, on top of deposits with painted wares which are identical with those of two sublayers of Tepe Hissar³ determines the minimum date of the culture periods identified by these ceramics. Our photographs of Tepe Siyalk are not sufficiently plastic to be shown here; but they were given to the excavators and may have been of some help to them.⁴

² Cf. Ghirshman, "Une tablette proto-élamite du plateau iranien," *Revue d'assyriologie et d'archéologie orientale* XXXI (1934) 115-19, also his *Fouilles de Sialk I-II* (Paris. Musée du Louvre. Département des antiquités orientales, "Série archéologique" IV-V [1938-39]).

³ Hissar IB and IC; cf. E. F. Schmidt, *Excavations at Tepe Hissar, Damghan* (Philadelphia, 1937).

⁴ One published in Ghirshman, *Fouilles de Sialk I*, Pl. I.

AIR WORK AT RAYY, THE BURIED CAPITAL OF SELJUK IRAN

HISTORICAL NOTES

BELOW our very garden of Safa'iyyah (Pls. 33, 37, and especially 38 *A*), below the near-by town of Shah 'Abdu'l-'Azim with its golden-domed sanctuary, and below the manors and fields of the inclosing plain (Pl. 34), there is Rayy, in times past one of the most magnificent cities of Islam. The era of its greatest splendor was that of the Seljuks, from the 11th to the 13th century after Christ. In 1221 the Mongols of Genghis Khan swept over Iran and Rayy, crushing the Seljuk dynasty and devastating the land. Timur (Tamerlane) completed the work of destruction during the following century. Rayy never recovered from these blows, and slowly its fortresses, mosques, palaces, and innumerable houses turned into mounds or flat hillocks. In spring the *sā'il*'s ("torrents") would rush the clayey dirt from the hill slopes and raise the plain. Thus in the past six hundred years most of the Seljuk capital has sunk below the surface, and the peasant of today sows his wheat where once stood the roofs of Rayy.

However, Seljuk Rayy was not the only city of this plain. There was a town prospering here in the first centuries of Islam, during the time of the Umayyads and under the 'Abbasid caliphs. Sasanian remains of the 3d-7th century are also found, though the actual town of this period seems to have been farther to the east. A religious structure of the Parthian period (3d century B.C. to 3d century after Christ) with coins of the time of Christ was uncovered on the Chashmah-i-'Ali mound of Rayy (Pls. 37-38). In 330 B.C. Alexander the Great stopped at Rayy, the Rhages of the apocryphal Book of Tobit, on his pursuit of the last Achaemenian king. Potsherds of a culture that flourished about 1000 B.C. occur in the fortress hill of the ancient city (Pl. 33), and early prehistoric towns (Pl. 38 *B*) which now form the main part of the Chashmah-i-'Ali mound were occupied by people who lived about five to six thousand years ago.

This nutshell summary sufficiently indicates the value of Rayy for archeological work. The Museum of Fine Arts in Boston and the Mrs. William Boyce Thompson Foundation of the University Museum in Philadelphia were the sponsors of the Rayy Expedition which started in the spring of 1934 and concluded its work in the fall of 1936.

THE CITADEL AND THE GOVERNMENTAL QUARTER OF RAYY

For the sake of comparison we show once more an aerial map view together with a drafted map conscientiously surveyed by C. H. Topping (Pl. 33). The process of surveying and drawing the ground map took more than three months. In case of necessity the air map would have been available a few hours after the exposure and one day after the architect had marked the 100-meter points, as explained in the section on Istakhr (p. 12).

The aerial view, further explained by the overlaid key, shows beautifully the relief of the citadel hill with a part of the pronounced crest of the eastern defense wall. The fortification inclosing the precinct which we call the "governmental quarter" is equally well indicated. The numerous details of the aerial map could not possibly be entered on the line-drawn survey. However, as to structural remains the latter again proves its advantage. Certain old fortification walls (drawn in black lines on the ground map) at the crest of the citadel hill are not well distinguished on the aerial view.

The dark square hole in the citadel mound seen on the photograph indicates the site of an excavation testing the depth and the stratigraphy of the hill. A second excavation is visible in quadrant GF in the governmental quarter. The test of this spot followed the analysis of an aerial photograph similar to that here shown and brought to light the remains of an important structure, perhaps a religious school, its walls decorated with interesting stucco designs. It is true, no wall contours were marked on the air view. We simply sounded one of several promising patches slightly elevated and betraying the presence of some outstanding building underneath the surface. For the air map only a few 100-meter points were marked on the ground. The others were measured and connected on the photograph in order to facilitate the comparison of the details on air view, survey, and ground.

Two oblique photographs (Pls. 31–32) show the citadel of Rayy in its topographic setting. On the first picture, clouds that formed in the subtropical climate of the Caspian Sea tower above the 14,000-foot mountain Sar-i-Tauchal. At the base of its talus, as a dark streak vaguely seen on Plate 32, Tehran, the garden city and capital of present Iran, forms an immense oasis in the plain. Plate 32 also shows two pronounced city walls diverging from the citadel, the heart of the defense system of ancient Rayy. The aerial photograph almost fakes a restoration of these ruined defenses, which are presumably more than six hundred years old. Every tower of the wall to the left is marked as clearly as though the fortification were still in use. But the present-day checkerboards of fields spread between the ancient walls dissolve the illusion, and the smoke from the chimney of a newly built cement plant blows nonchalantly over the crumbled ramparts of the citadel of Rayy.

RAYY, THE BURIED CAPITAL OF SELJUK IRAN [31]

We tested many spots in the extensive area once covered by the ancient city. Always we found beautiful vessels of the Early and Middle Islamic periods; but nearly all had been shattered. Out of thousands of fragments of pots broken by the housewives of old Rayy and discarded in the trash pits and sewage holes near their houses, our expert restorers had to assemble and restore the vessels. Together with the precious wares of the Seljuk period—bowls decorated in miniature style, others with gold-brown metallic luster, pitchers, bowls, and plates in delicate turquoise blue, cobalt, or ivory white—there appeared in the trash pits many coins of gold, silver, and copper and many personal ornaments of precious metals. We can only believe that the cautious people of Rayy often hid their cash and ornaments in the most obnoxious spots.

With the aid of the former Minister of Education, His Excellency Ali Asghar Hekmat, and M. Godard, the director of the Service of Antiquities, we succeeded in sounding the area of Husainabad, shown on Plate 34, although the owner, an aged princess of the displaced Qajar dynasty, and particularly her lawyers tried their best to interfere. Here we found many of the Seljuk objects mentioned above and also interesting vessels of the time of the 'Abbasid caliphate. The square and oblong excavations seen in the right half of the picture were made by the expedition. The pockmarked areas show the activities of former pot-hunters and gold-washers. Rayy has been quite a gold mine for the treasure-diggers of the past six to seven hundred years. In the upper right corner is part of a complex of houses grouped around a ruined sanctuary, Bibi ("Lady") Zubaidah (not shown).

At the outskirts of Rayy, on a rocky outpost of Mount Bibi Shahrbanu, stood a royal mausoleum of the Middle Islamic period. The tower of the once impressive monument had risen more than a hundred feet above its circular foundation, to judge by the still standing though probably older tomb tower of Gunbad-i-Qabus (Pl. 64) in the Gurgan plain. When we started work Naqarah Khanah ("Drum House"), as the tomb near Rayy is now called, was only a huge pile of debris with some walls of the substructure showing. We uncovered the architecturally important remnants of this monument, as shown on Plates 35 and 36. The tomb chambers of the royal family had been rifled by diggers about ten years ago. However, we found some more pieces of such interesting fabrics as those which had been recovered previously. With infinite care Mary-Helen sewed the valuable fragile scraps on pieces of white fabric in order to restore their designs and to preserve the garments. Our Islamist, Dr. George C. Miles, was delighted with bits of a yellowed paper—a contract written in ink more than seven hundred years ago. The architect, Van W. Knox, restored on paper the whole structure and the fragments of stucco decoration once ornamenting the lower wall of the interior.

The two photographs of this site supplement each other. The vertical view shows the contours of the monument. There is an inner circle, the foundation for the tomb tower, inclosing the

royal tombs. The outer circle seems to be the foundation for a simple inclosure. At the base of the hill, somewhat to the right, appear the rectangular contours of a court which apparently inclosed a circular structure, most probably another mausoleum. The ground view shows the crew at work above the high façade of Naqarah Khanah. It furnishes the perspective for the vertical photograph and shows the position of the tomb structure in relation to the plain and to the spur of the mountain. The small tower at a point higher on the slope may belong to the same period as the royal mausoleum or to a somewhat later time.

THE CHASHMAH-I-‘ALI MOUND OF RAYY

We mentioned above that the earliest settlements of the plain of Rayy are hidden in the Chashmah-i-‘Ali (“Spring of ‘Ali”) mound. This ruin hill accumulated beside a rocky crest carrying also a defense wall of the Islamic era. The mound rises above the poplars of the garden of Safa’iyyah in which were the ideally situated quarters of the expedition. Prehistoric ceramics had here been found in a sounding made by the Délégation en Perse.¹ In addition, the potsherds on the surface give a clue as to most of its strata. There are fragments of the 4th millennium, familiar to us from the early strata of Tepe Hissar near Damghan. The characterless sherds of the Parthian period were at first not recognized; but they are present. Glazed bits indicate an Islamic top layer. But the ware of the earliest settlement was not represented by surface sherds. It is too deeply buried below the debris of centuries of later occupation. The ceramics of the earliest period determined at Rayy are almost identical with the pottery of the lowest layer of Anau in Turkestan.² Not a trace of metal occurred in the bottom refuse of the mound. The “Anau I” stratum of Rayy seems to belong to the New Stone Age.

The Chashmah-i-‘Ali mound is illustrated on Plate 37 by a vertical photograph together with a line-drawn map prepared before the “Friend of Iran” could do the mapping. Although the light was not very favorable, the photograph would have sufficed for our purposes as a topographic map. In the excavations a Parthian structure, mentioned above (p. 29), is visible on the southern spur in the center. A deep square hole north of it shows the main test of the mound, also pictured on Plate 38 *B*, a ground view. The center of Plate 38 *A*, an oblique photograph, is occupied by the Chashmah-i-‘Ali mound with our excavations. An Islamic city wall follows the crest of the hill, while above the distant haze which hides Tehran rises the mountain Sar-i-Tauchal. The excavation scene on Plate 38 *B* shows the crew at work in the deep square test. The mud wall

¹ For a brief account of the “Mission de Téhéran,” but without mention of such finds, see France. Délégation en Perse, “Mémoires” XII (Paris, 1911) 51–61; pp. 55–57 deal with Rayy.

² See Raphael Pumpelly, ed., *Explorations in Turkestan, Expedition of 1904. Prehistoric Civilizations of Anau: Origins, Growth, and Influence of Environment* (2 vols.; Washington, D.C., 1908).

RAYY, THE BURIED CAPITAL OF SELJUK IRAN [33]

fragments at the bottom of the excavation belong to a settlement that flourished here about fifty-five hundred years ago. The ropes mark excavation units corresponding to four small squares on the drafted survey.

THE AIR MAP OF CHAL TARKHAN, A SASANIAN PALACE NEAR RAYY

Plate 39 shows the complex of mounds called Chal Tarkhan ("Pit of Tarkhan"), situated not far from the village of the same name and about 10 miles south of Rayy. The active antiquity-hunters of Tehran had scratched this site as well; but they had not damaged it enough to make it useless for research. In the case of Chal Tarkhan no survey whatsoever was available or required. The 100-meter points were staked and marked by cloth circles, as explained in regard to Istakhr. The aerial view was taken, and work began, planned according to surface considerations and according to the analysis of the aerial view. To our regret there was no opportunity to take another photograph of this site after the completion of the operations. It would have shown the contours of a small Sasanian palace uncovered in the "palace mound" directly north of the "citadel mound," the main elevation of the site. Tests were distributed over most of the low hillocks marked on the air view, which also shows patches of white alkaline soil on its lower half.

For the sake of perspective a ground view (Pl. 40) again supplements the aerial photograph. In the background tower the remains of the ancient citadel. The columns of the palace are seen emerging from the debris in the foreground. A wealth of stuccoes once ornamented this building, which was presumably a hunting-palace of one of the later Sasanian princes. The debris was filled with fragments of plaques showing a prince on horseback, in characteristic Sasanian dress with flowing ribbons, hunting boar and gazelle. We found plaques illustrating a famous legend: Bahram (V) Gur, a Sasanian ruler, with his arrow nails the foot of a gazelle to its head, while his favorite lady, mounted behind the prince on his hunting camel, plays the lute or lyre. There were also fragments of plaster sculpture, the head of a prince as well as body parts, painted in polychrome. The niches, archways, and columns of the palace were covered with an abundance of attractive stucco designs resembling those of a similar palace once excavated by the expedition at Tepe Hissar.³

³ See Fiske Kimball, "The Sasanian building at Tepe Hissar," in Schmidt, *Excavations at Tepe Hissar, Damghan*, pp. 347-50.

SEARCHING IN VAIN FOR PARTHIAN HECATOMPYLOS

WHEN in 1931–32 the Philadelphia expedition of the University Museum and the Pennsylvania Museum of Art, generously supported by Mrs. William Boyce Thompson, excavated the Hissar mound in the plain of Damghan, overland excursions combed the environs in search of Hecatompylos, one of the Parthian capitals. It was never found. However, an important town does not simply disappear from the face of the earth in the course of two thousand years. True, all ordinary houses may have been leveled by climatic agents and especially by the mud torrents of successive springs; but the city wall, fortresses, and blocks of palatial structures should survive above ground in the form of mounds.

At any rate, once the airplane had arrived in Iran, we wanted to combine a personal pilgrimage with another effort to trace the evasive city. Our route was to follow that of Alexander the Great on his pursuit of Darius Codomannus, who was then assassinated by his own men near Hecatompylos.

About 40 miles east of Tehran and Rayy a spur of the Elburz Mountains is crossed by a pass which many historians identify with the Caspian Gates mentioned by the recorders of Alexander's campaigns. Aerial photographs (Pl. 41) and a ground view (Pl. 42) taken during an overland excursion give a good idea of the topography of this spot. The last picture emphasizes the height of the canyon at the entrance to the pass.

The oblique photograph (Pl. 41 *A*) shows the rough relief of the limestone(?) spur cut by the pass and by a modern highway, both visible in the lower left half of the picture. Beyond the hills the light-colored streaks of the Dasht-i-Kavir ("Salt Desert") fade into the horizon. The importance of this age-old pass is marked by a fortress of problematical antiquity once protecting the gate of the defile. The stronghold has turned into a rectangular mound, inclosed by the depression of a moat, as seen at the lower edge of the vertical view and in the right foreground of the oblique. We have to admit that we failed to see this site when passing it by car about a hundred yards to the left.

From the opposite end of the Caspian Gates a vast plain opens toward the east. Part of it is steppe with streaks of desert; but many oases with clusters of villages and mosaics of cultivation show the spots where sweet water is not yet displaced by the encroaching *kavir*. Many mounds,

SEARCHING IN VAIN FOR PARTHIAN HECATOMPYLOS [35]

formed by citadels and by former settlements, are scattered over this plain; but none of the ruin hillocks suggests the remains of a large-sized town.

About a mile west of Damghan, Fred Lillich and Baba Khan the foreman had prepared a landing field with the aid of former Tepe Hissar workers. Here was the base of our operations, from which we started our circling and combing of the plain, searching for the remains of the Parthian city. From the edge of the "Salt Desert" in the south to the Elburz valleys in the north and from the western end of the Damghan plain to Shahrud and Bustam in the east we combed the ground below. We did not find the "Town of a Hundred Gates." Perhaps it is actually buried under the dunes south of Damghan, as A. V. Williams Jackson suggests;¹ perhaps it lies farther to the east.

But our time was not spent uselessly. Over and over again we circled above the excavations of Tepe Hissar ("the Citadel Mound"), which is shown on Plate 44. We could study our mistakes, seeing the faint elevations which we had omitted to test in 1931-32. The excavations in the pre-historic settlements are in the center of the picture, while to the left the contours of a Sasanian palace are marked (cf. p. 33). A ruined caravanserai of the Islamic era is near the upper edge, and the rest of the photograph is filled with grids of irrigated fields and crossed by the dump craters of two subterranean water conduits (*qanāt's*).

It is also interesting to study the appearance of a ruined, apparently short-lived city, or more probably military camp, of the Islamic era. The present name of the site, shown on Plate 45, is Tepe Mu'min, referring mainly to the pronounced citadel hill of the town, which is situated about 20 kilometers east of Damghan. When testing it in 1931 we found a coin of the 15th century after Christ and ceramics fitting into this period. The aerial view shows clearly marked building compounds, often filled with odd lengthwise divisions which have the appearance of storehouses rather than dwellings.

Bustam, a typical small Iranian town, is shown on Plate 43.² A defense wall with many towers incloses the clusters of houses, the 9th-century tomb of Shaikh Bayazid, a tomb tower attributed to about the year 1300 of our era, and other interesting structures. Fields surround the town and reach as far as sweet water will reach; but beyond is steppe and desert. Near-by Shahrud was considered by A. D. Mordtmann in 1869 as a possible site for the Parthian city; but there are no archeological criteria to support his opinion.³

We did not expect to find Hecatompylos at the brink of the "Salt Desert" which fills the north-

¹ *From Constantinople to the Home of Omar Khayyam* (New York, 1911) pp. 162 ff.

² Its monuments are described in Sarre, *Denkmäler persischer Baukunst* (Berlin, 1901-10), and also in Jackson, *op. cit.* pp. 192 ff.

³ See bibliographical note on Hecatompylos in N. C. Debevoise, *A Political History of Parthia* (Chicago, 1938) p. 15.

ern center of the Iranian plateau. But we wanted to exhaust all possibilities in our city hunt. With southern course we raced across the Shahrud–Damghan plain, aiming at a pin point on the map called Turut. Plate 46 *A* has nothing to do with archeology; but the strange, dome-shaped formation may be of interest for oil geologists, as a Boston geographer-geologist pointed out to us. It also shows what we had to expect in case of a forced landing. Parts of the *kavīr* surface belong to the most hostile and repulsive regions of the globe, mires of salt and mud with islands of semisolidified waves of slime. Shortly before our flight one of the gendarmes of Damghan had disappeared, horse and all, in the *kavīr* while patrolling the sparse villages at its brink.

Turut is one of these places at the rim of the infernal *kavīr*. It is actually wedged between two salt deserts, the *kavīr* of Damghan and the “great *kavīr*.” It owes its existence to a thread of sweet water breaking from a low range of hills which partly separates the lifeless plains. The center of Plate 46 *B* shows the mud houses huddled together as though afraid of the surrounding desolation. Little “skyscrapers” of three or four stories also indicate the desire of the Turutians to crowd as closely as they can and to preserve every bit of arable soil for the fields that appear like a patch of inlay in the foreground of the picture. A semicircle of sheep corrals incloses the little desert town, while the lines of craters of *qanāt*’s (subterranean water conduits) point to the source of sweet water and its life.

In Marco Polo’s narrative the activities and the strongholds of the Old Man of the Mountain and his assassin followers are described.⁴ Here Girdkuh is mentioned, the castle of the Assassins that withstood the siege of the Mongols long after Alamut (cf. p. 64 and Pl. 73) was taken by Hulagu Khan in A.D. 1256. On Plate 47 we show Girdkuh (“Round Mountain”), a cylindrical rock rising above the foothills of the Elburz range, 18 kilometers west of Damghan. Black storm clouds sweeping up from the Caspian plain through the wind gap of Damghan give a proper setting to the rocky wilderness and to the crumbled stronghold of the *ḥashīshīyīn* or Assassins,⁵ who, drugged by *ḥashīsh*, would pursue with dagger and poison their religious and political antagonists.

Parts of the castle walls are still standing on the sloping summit of the rock, and several basins that caught the water of the winter rains are also preserved. Concentric fortifications protected the hill. The outermost double wall is faintly marked on the picture near the base of the talus. The Assassins had good reason to protect their lairs.

A structure of hewn stone at the foot of Girdkuh was called “Prison of Darius” by an Iranian

⁴ *The Book of Ser Marco Polo . . .* tr. and ed., with notes, by Colonel Sir Henry Yule (2d ed., rev.; 2 vols.; London, 1903) I 132 ff.

⁵ On the etymology of this word see *Encyclopaedia of Islām* I 491 and E. G. Browne, *A Literary History of Persia* II (Cambridge, Eng., 1928) 204 f.

SEARCHING IN VAIN FOR PARTHIAN HECATOMPYLOS [37]

teacher who once accompanied us on an overland trip to this spot. The type of construction suggests pre-Islamic origin. To judge by the excellent tactical position of Girdkuh it may well have been the site of a fortress in early historical times.⁶ If Hecatompylos should still be found in the Damghan plain, Girdkuh may have been the site of ancient Tagae or Tage,⁷ though Jackson and others⁸ are inclined to consider modern Taq northeast of Damghan as its site.⁹ However, we saw no pronounced traces of antiquity at Taq.

⁶ We may have overlooked pre-Islamic sherds when we combed the hilltop in 1931. Sherds of Seljuk and Mongol times were found.

⁷ Cf. Josef Marquart, *Untersuchungen zur Geschichte von Eran*, 2. Heft (Leipzig, 1905) p. 44.

⁸ See Jackson, *op. cit.* p. 183.

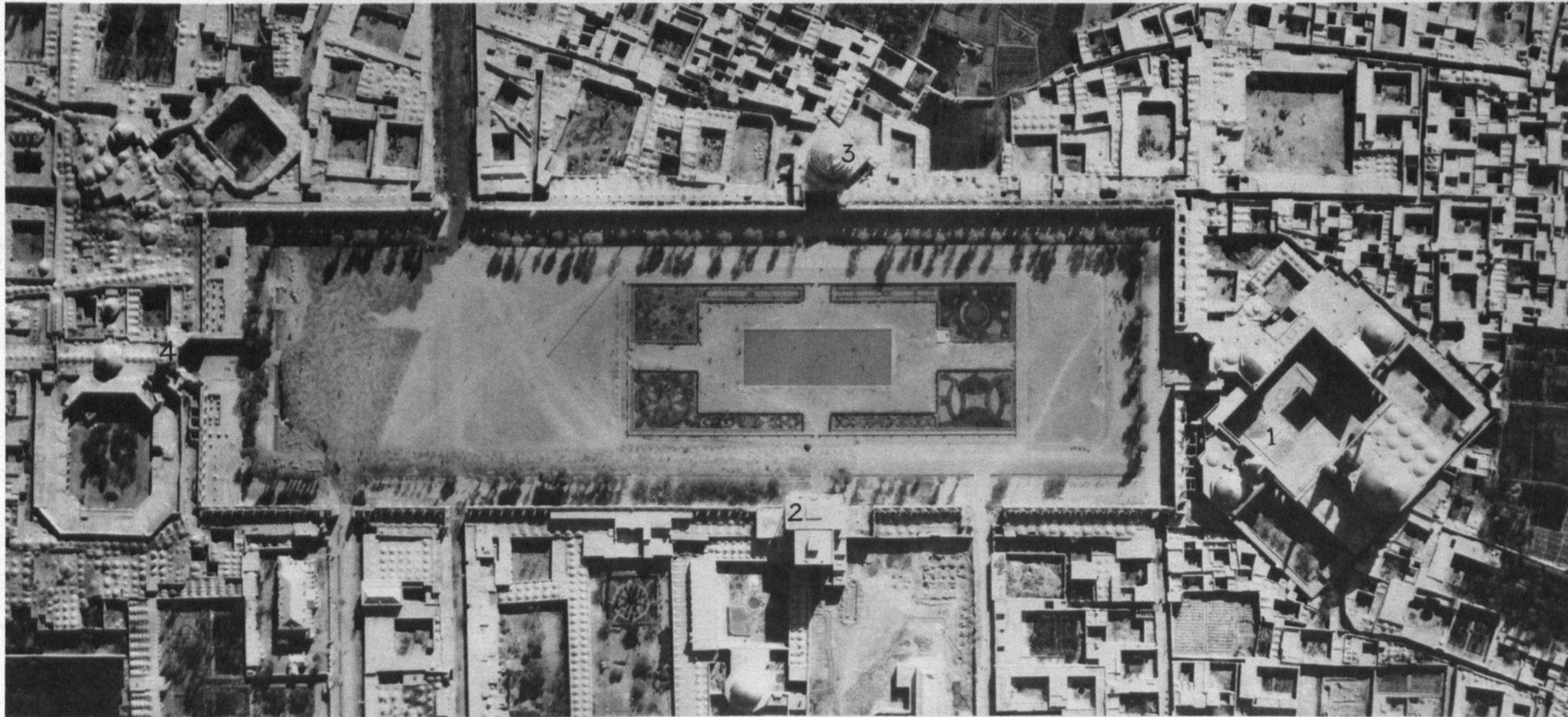
⁹ Cf. map of the environs of Damghan in Schmidt, "Tepe Hissar excavations, 1931," Pennsylvania University Museum, *The Museum Journal* XXIII (1933) Pl. LXXV.

*PLATES 25-47 * CENTRAL AND NORTHERN IRAN*



ISFAHAN, THE MOST BEAUTIFUL CITY OF IRAN

During the period of the Safavid shahs Isfahan was the capital of the kingdom. Beautiful structures of that time still adorn the lovely town. The Mosque of the Shah fills the center foreground of our picture. It is the most magnificent architectural remnant of this last renaissance of Iranian art. (July 6, 1937; 6:55 A.M.; altitude, 200 meters; 1/250 sec.; filter A; direction of view, NE.)



MAP VIEW OF THE TOWN "SQUARE" OF ISFAHAN

Four prominent buildings are situated at the four sides of the Maidan. The Mosque of the Shah (1), its main axis oriented toward Mecca, is at the right end of the picture. At the opposite, northern end of the town "square" is the entrance to the extensive bazaar (4). The dome of the Mosque of Shaikh Lutfu'llah (3) is seen near the upper long side, almost directly opposite the royal pavilion of 'Ali Qapu (2). A neatly designed garden and pool now fill part of the "square," which was once a polo field. (April 14, 1936; 8:15 A.M.; altitude, 915 meters; 1/250 sec.; no filter.)



THE MASJID-I-JUM'AH ("FRIDAY MOSQUE") AT ISFAHAN

Students of Islamic architecture will be interested in the bird's-eye view of the famous mosque seen in the left foreground. The large domes and the small brick turrets of the mosque, of the bazaar street, and of private houses add to the attractiveness of this picture. (*May 23, 1936; 6:37 A.M.; altitude, 762 meters; 1/100 sec.; filter A.*)

AN OLD FORTRESS NEAR ISFAHAN

Remnants of medieval and perhaps Sasanian structures crown the summit of a rocky hill in the plain of Isfahan. (May 9, 1936; 8:04 A.M.; altitude, 305 meters; 1/250 sec.; no filter.)





THE MOUND OF HAVAH

We will gladly supply the future excavator of this promising site with the aerial photographs taken on one of our shuttle flights between Persepolis and Tehran. The truncated conical mound may contain much revealing information. Attached to it is an area which is protected by a well defined fortification wall, while the rough formation of a town deposit spreads from the main mound in three directions. (*May 16, 1936; 5:32 A.M.; altitude, 1,500 meters; 1/100 sec.; no filter.*)



THE OLD MOSQUE OF SAVAH SURROUNDED BY POT-HUNTERS' HOLES

The stump of a minaret stands beside the trapezoid mosque inclosure. The honeycombs made by pot-hunters prove the former wealth of Savah's soil. Many beautiful polychrome vessels of the Seljuk period were found here. (*May 9, 1936; 9:55 A.M.; altitude, 610 meters; 1/250 sec.; no filter.*)

PLATE 31

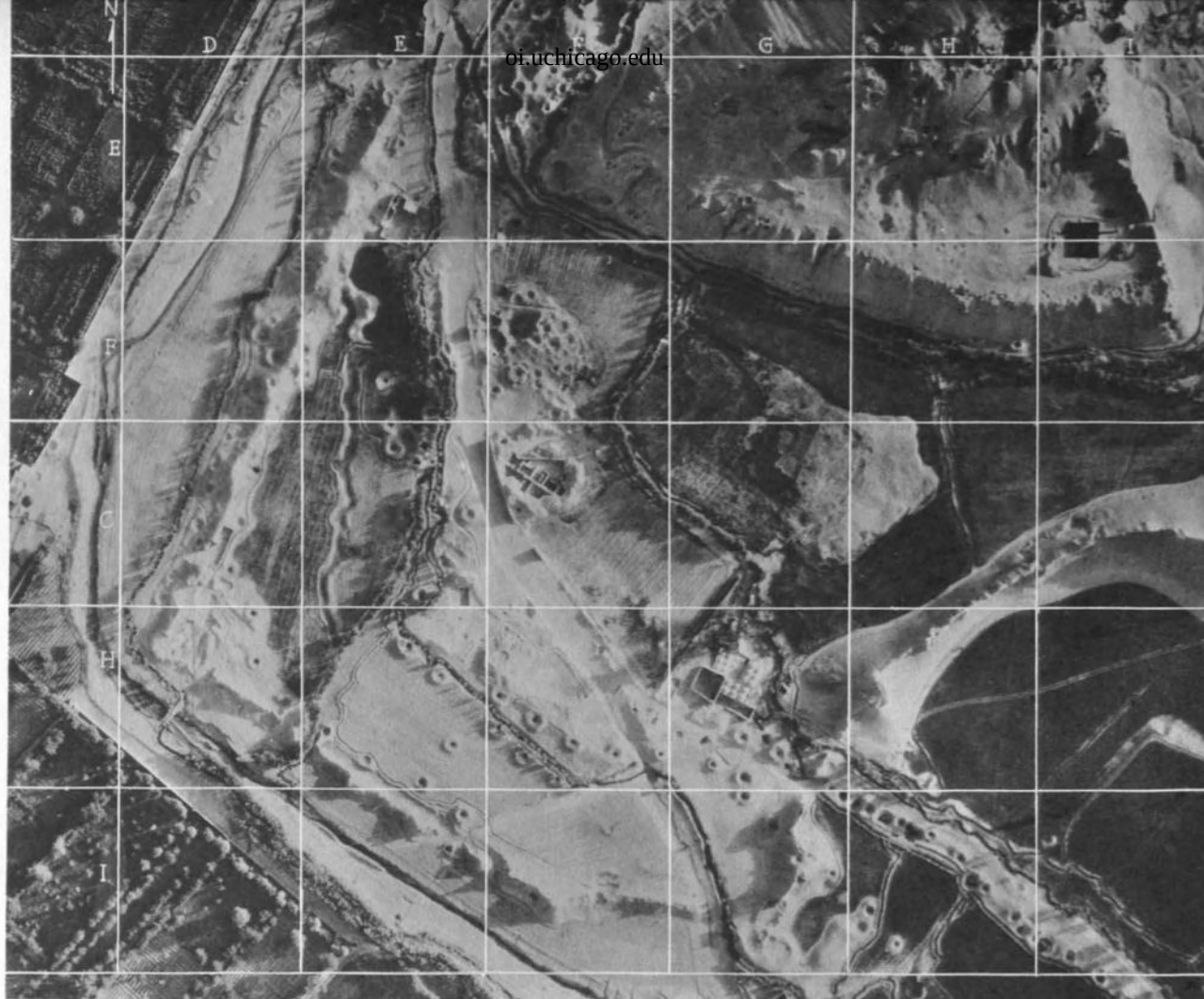
*THE CITADEL OF RAYY*

This oblique view is continued eastward on Plate 32. The main part of the citadel is in the left center. Below the fortress a section of the inclosure of the ancient governmental quarter rises above the Rayy plain, while the mountain Sar-i-Tauchal fills the background. (*May 15, 1936; 8:08 A.M.; altitude, 70 meters; 1/250 sec.; no filter.*)



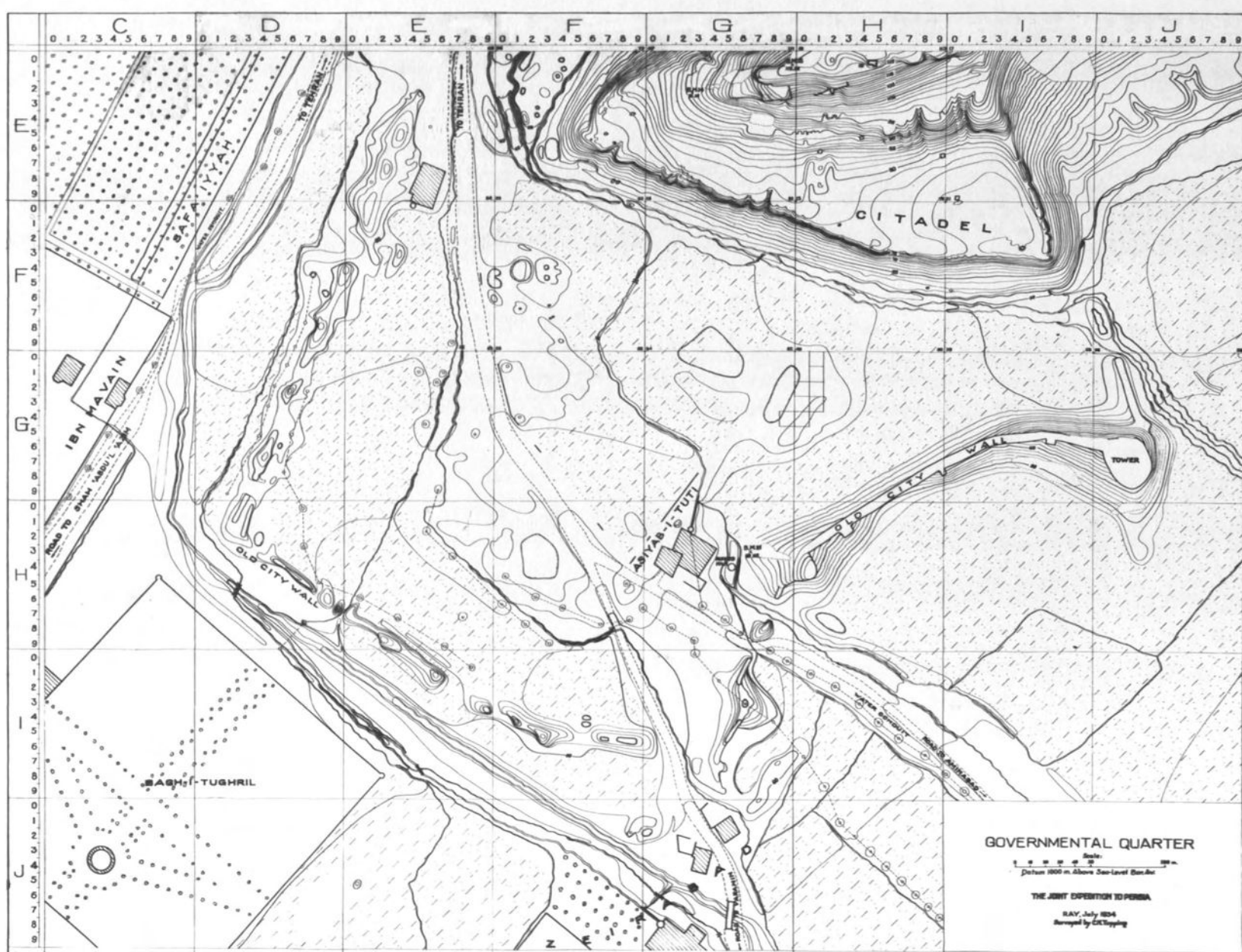
CITY WALLS OF RAYY

The heart of the defense system of ancient Rayy was its citadel, a fortified rock crest expanding into a considerable mound seen at the center of the left margin. From the citadel the girdle walls that defended the city extend into the plain. Plowed fields now spread where rose the roofs of the buried city. The dark band at the foot of the distant mountain is Tehran, the present capital of Iran. (*June 1, 1936; 6:08 A.M.; altitude, 280 meters; 1/250 sec.; filter A.*)



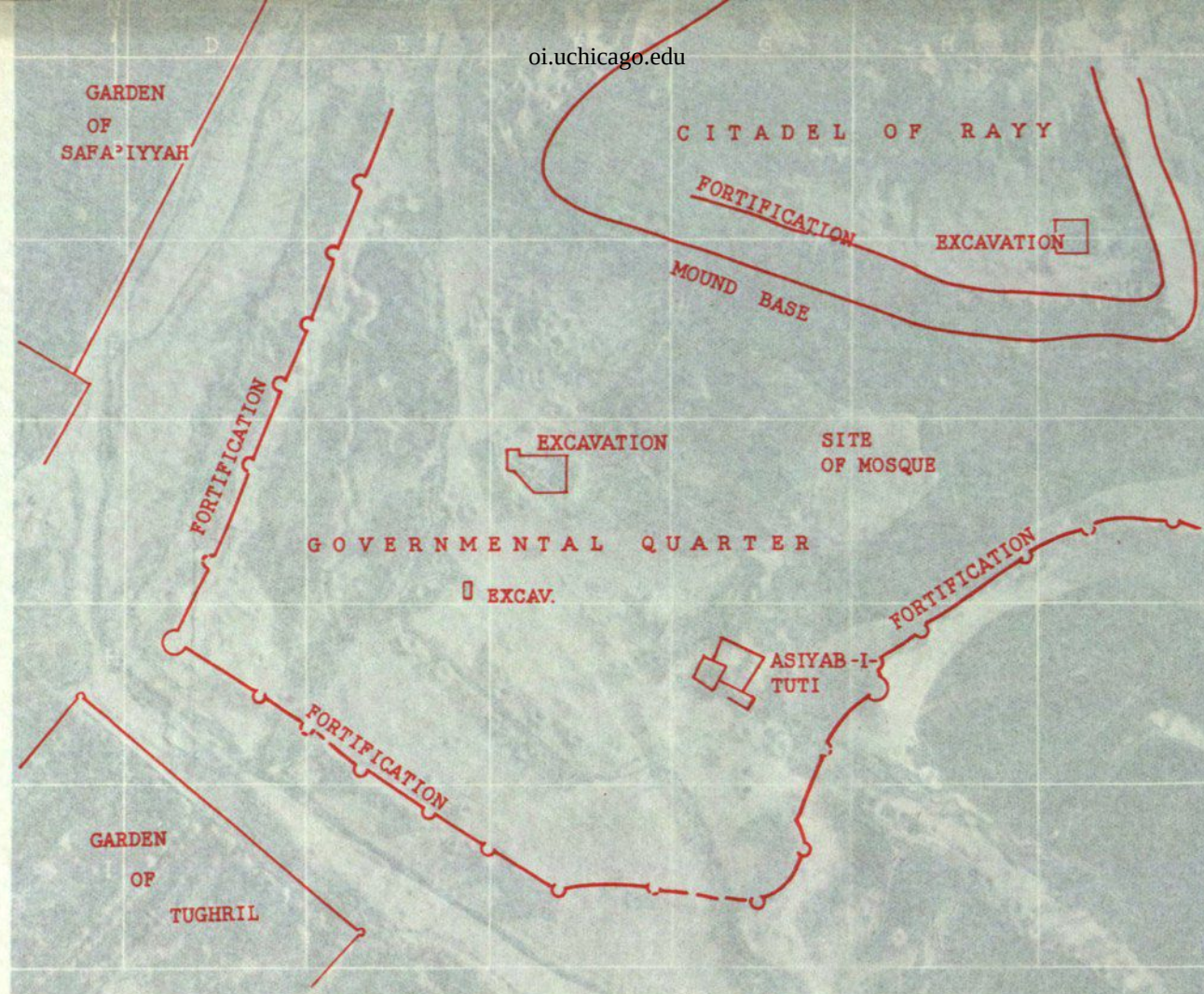
A. THE GOVERNMENTAL QUARTER AND THE CITADEL OF RAYY

The polygonal area inclosed by a fortification wall and adjoining the hill presumably includes governmental buildings of the ancient city. A comparison of the vertical photograph *A* with the drafted map *B* shows the relative wealth of detail on the air view so valuable for archeological interpretation of the ground. Grid points marked on the ground prior to photographing co-ordinate the aerial view with the survey. (June 1, 1936; 6:00 A.M.; altitude, 1,372 meters; 1/250 sec.; no filter.)



B. DRAFTED MAP OF THE GOVERNMENTAL QUARTER AND THE CITADEL OF RAYY

Time and funds in quantity were spent in preparing this map of the area shown in *A* in a single aerial photograph, made adequate to its purpose by a simple ground preparation.



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EXCAVATIONS IN THE PLAIN OF RAYY

The square and oblong excavations tested the area of Husainabad. Beautiful vessels of the Seljuk period were here found. The honeycombed patches are the results of commercial diggings. Treasure-hunters have for hundreds of years burrowed in the soil of Rayy for Seljuk gold. (*June 1, 1936; 5:40 A.M.; altitude, 1,200 meters; 1/100 sec.; no filter.*)



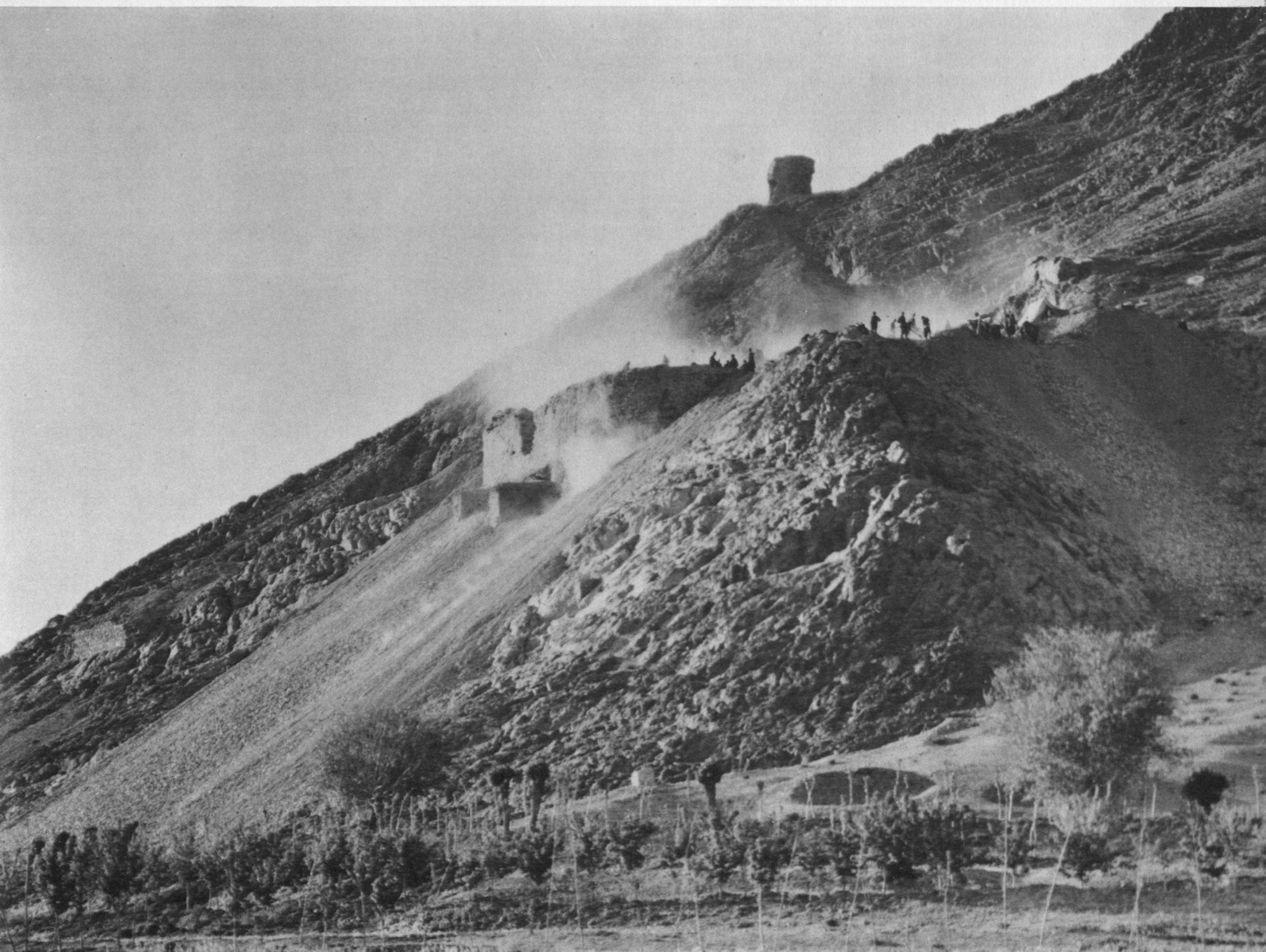


MAP VIEW OF NAQARAH KHANAH, A ROYAL TOMB OF THE SELJUKS AT
THE OUTSKIRTS OF RAYY

(April 13, 1936; 5:13 P.M.; altitude, 150 meters; 1/250 sec.; no filter.)

GROUND VIEW OF NAQARAH KHANAH DURING THE EXCAVATION

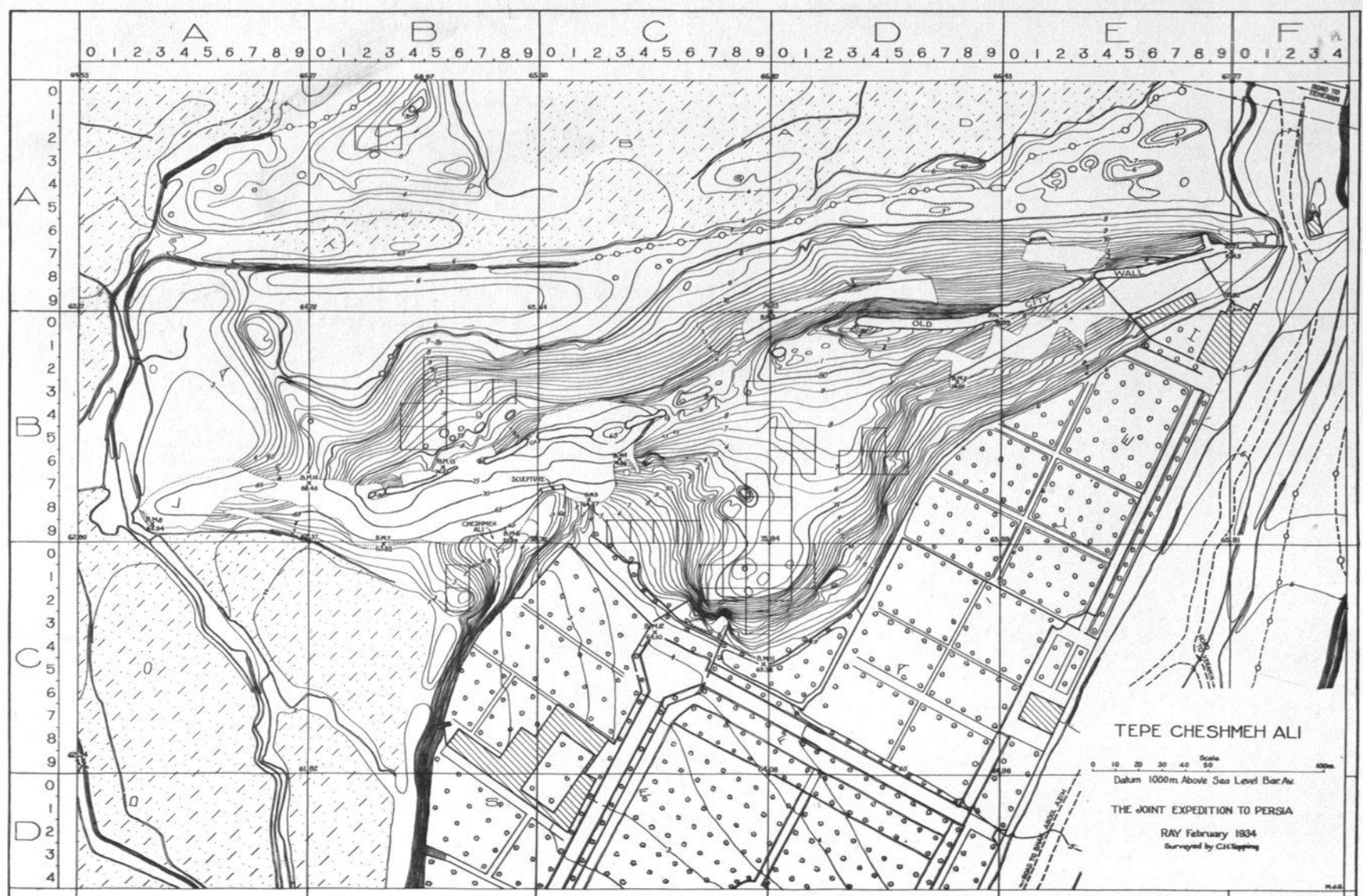
This ground photograph adds the perspective lacking in Plate 35, the aerial view. On the latter the inner one of the two concentric circles represents the base of a tower formerly rising above the graves of the royal family. Silk fragments and stuccoes were found in the debris. At the foot of the rock spur of Naqarah Khanah Plate 35 shows a rectangular mound formation with a faintly indicated circular center. Here another tomb seems to be situated.





A. THE MOUND OF CHASHMAH-I-ALI AT RAYY

Again we compare the vertical view of a mound formation (A) with a drafted survey (B). Had certain grid points been marked on the air view, it would have been quite sufficient as a general mound map. Excavated structures are indicated on the aerial picture. A deep square test defined the succession of cultures in this most important prehistoric hill of Rayy. (June 1, 1936; 5:55 A.M.; altitude, 1,372 meters; 1/250 sec.; no filter.)



B. DRAFTED MAP OF THE CHASHMAH-I-ALI MOUND

If the Rayy Expedition had had an aerial department at the beginning of its work this map would never have been drawn, except for parts of the survey grid of 100×100-meter units and some remains of defense walls.



A. OBLIQUE VIEW OF THE CHASHMAH-I-ʿALI MOUND AT RAYY

The oblique view is an interesting, almost essential supplement to the vertical photograph of Plate 37 A. The mound with the excavations is seen in the center. (May 15, 1936; 8:10 A.M.; altitude, 70 meters; 1/250 sec.; no filter.)



B. GROUND VIEW OF THE TEST IN THE CHASHMAH-I-ʿALI MOUND

The earliest history of Rayy is here being determined by slicing the successive levels of occupation. The first settlers of Rayy lived at this spot more than six thousand years ago, while burials of the Islamic era fill the top layer of the mound.



THE SASANIAN SITE OF CHAL TARKHAN, SOUTH OF RAYY

This vertical view was used, considerably enlarged, as the basis for all the excavations at this extensive site and proved to justify excellently our claim that the aerial photograph can displace the survey of mound formations. In the second hillock from the north we uncovered a small Sasanian palace with many beautiful stucco units. (*April 13, 1936; 5:30 P.M.; altitude, 915 meters; 1/250 sec.; no filter.*)

EXCAVATIONS IN THE SASANIAN PALACE OF CHAL TARKHAN

On this ground picture two columns with ornamented stucco surfaces are appearing in the debris of the palace. In the background the most prominent elevation of the site, the citadel, rises above its surroundings.

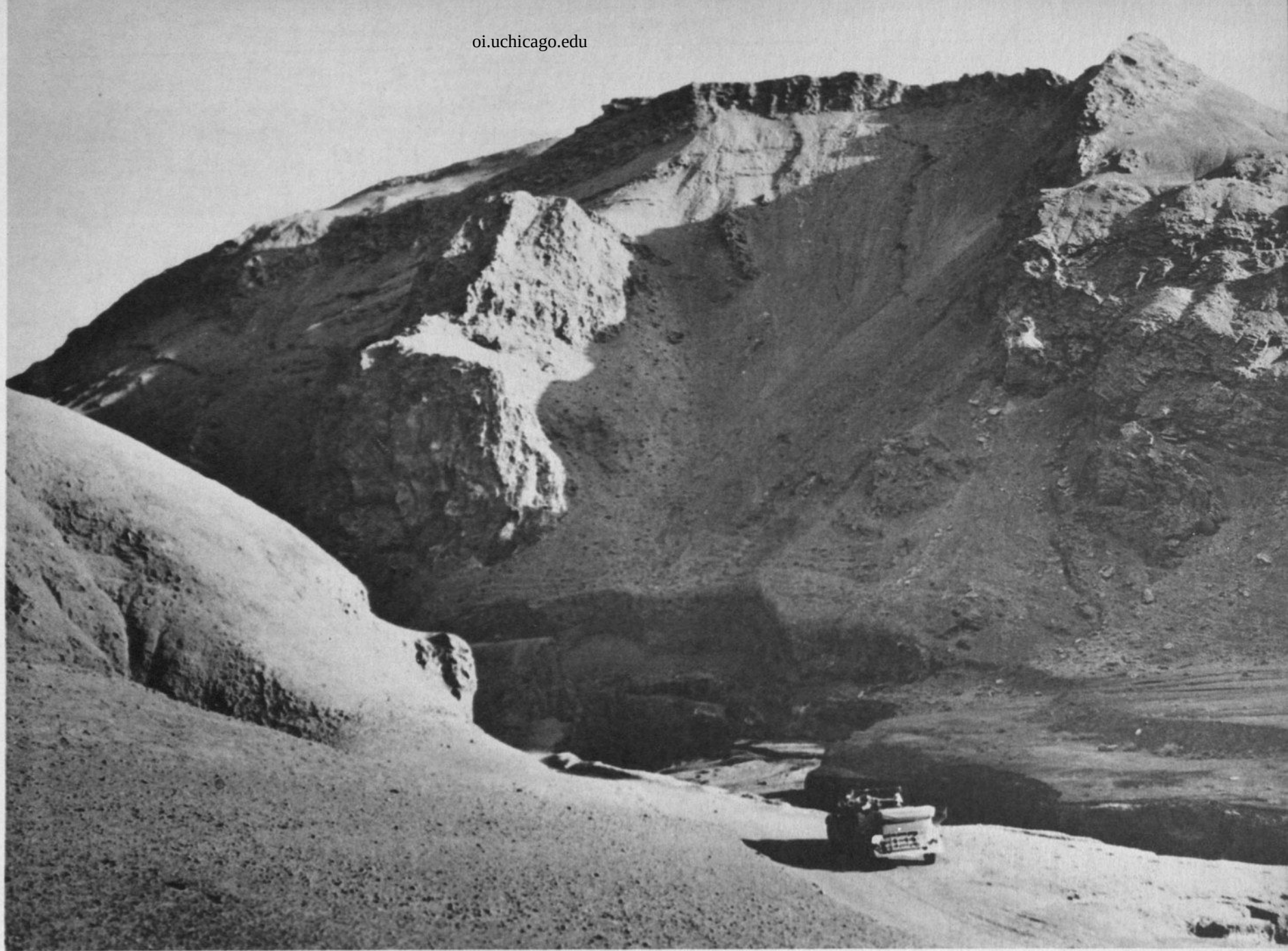




A



B



THE ENTRANCE TO THE CASPIAN GATES

The ground view supplements the two aerial photographs (Pl. 41) and shows the height of the canyon walls bordering the defile.

A. OBLIQUE VIEW OF THE CASPIAN GATES

Historians claim that Alexander the Great used this defile when pursuing the last Achaemenian ruler from Rhages (Rayy) to Hecatompylos. (*September 18, 1935; 7:30 A.M.; altitude, 915 meters; 1/240 sec.; orange filter [dark].*)

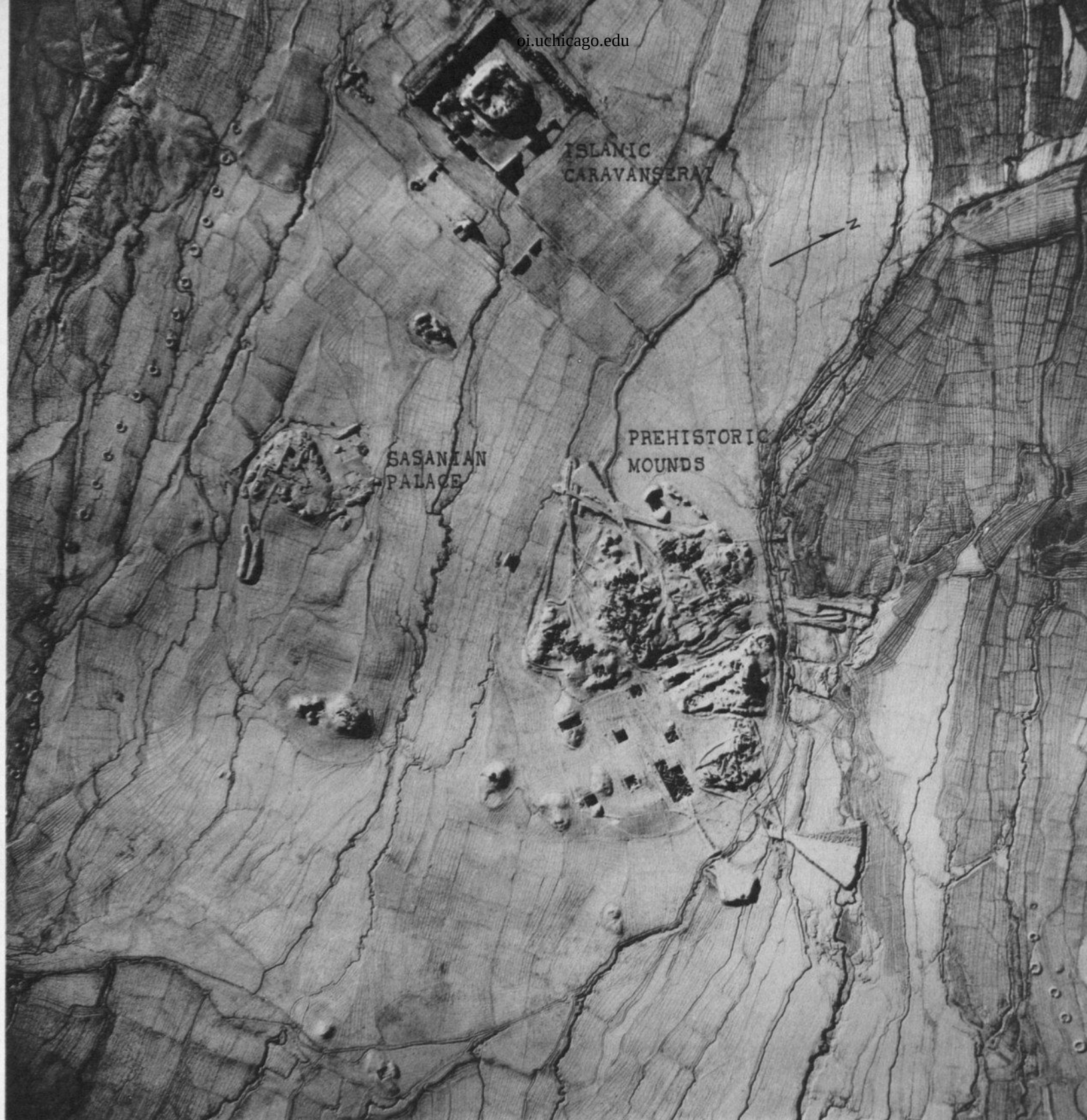
B. VERTICAL PHOTOGRAPH OF THE ENTRANCE TO THE CASPIAN GATES

A fortress, now a rectangular mound, once protected the entrance and exit of this important pass. A modern highway enters the defile at the left edge of the picture. (*September 18, 1935; 7:35 A.M.; altitude, 915 meters; 1/240 sec.; orange filter.*)



BUSTAM, A PLACE OF PILGRIMAGE IN NORTHERN IRAN

Bustam is a typical small Iranian town. A fortress wall once protected it against invaders and bandits, but the town defense is now dilapidated. Times are peaceful in modern Iran. A girdle of fields incloses the settlement, forming an oasis in the desert plain. In the right center of the house clusters stands a holy shrine. (*September 23, 1935; 7:27 A.M.; altitude, 610 meters; 1/140 sec.; yellow filter.*)



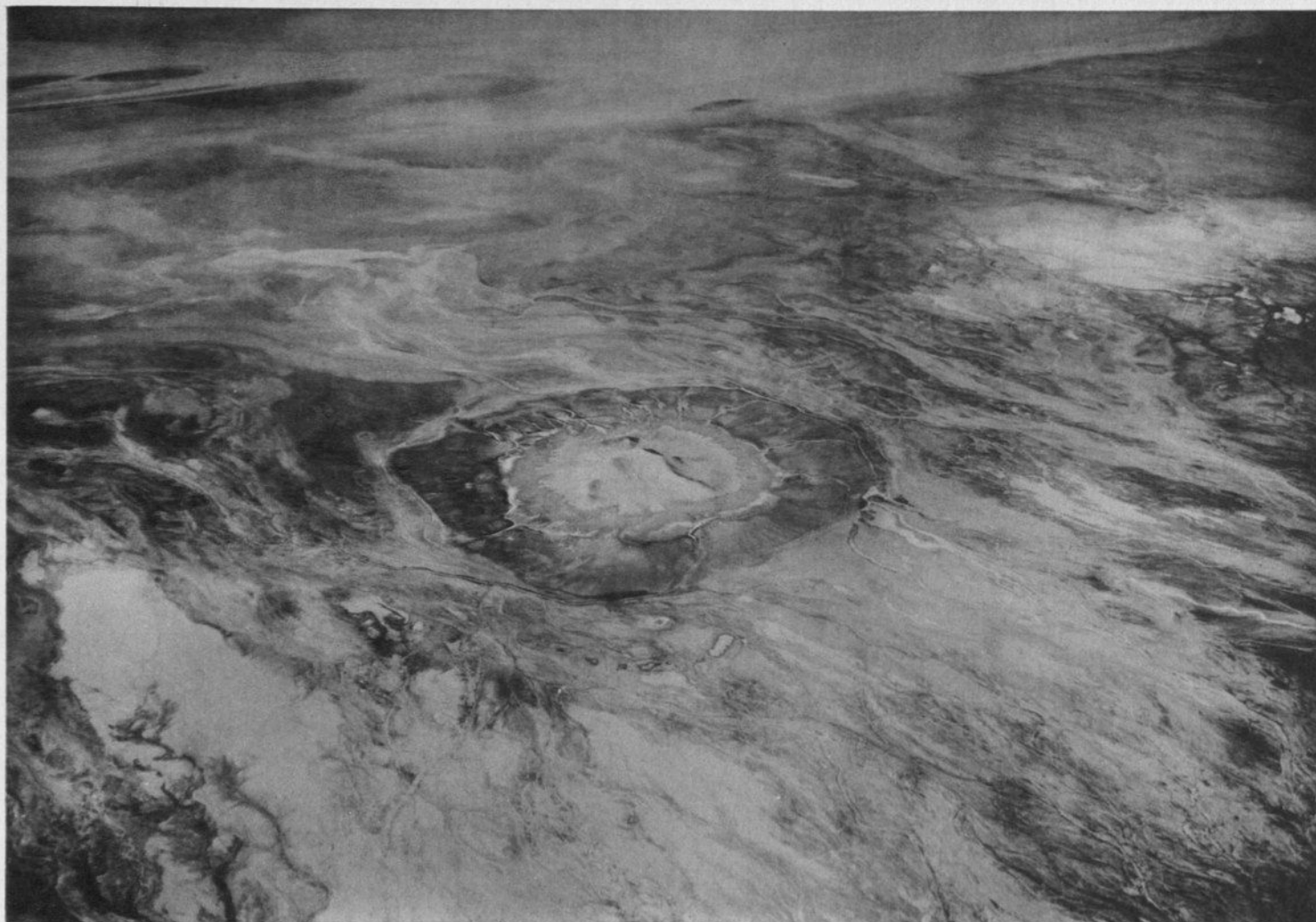
THE HISSAR MOUND NEAR DAMGHAN

In 1931-32 the joint expedition to Iran sponsored by Mrs. William Boyce Thompson, the University Museum, and the Pennsylvania Museum of Art in Philadelphia excavated at this site more than sixteen hundred prehistoric burials in addition to an interesting Sasanian palace. In the center of this vertical view appear the excavations in the prehistoric mound, while the Sasanian palace site is to the left. A ruined caravanserai of the Islamic period is near the upper edge. The rows of small craters are manholes of subterranean water conduits called *qanāt's*. (September 23, 1935; 4:05 P.M.; altitude, 1,525 meters; 1/140 sec.; orange filter.)



MU-MIN TEPE, A CITY SITE OF THE ISLAMIC ERA

Test excavations at this site, situated about 20 kilometers east of Damghan, brought to light an Islamic coin of the 15th century. The thinness of the deposit and the character of the buildings with long subdivisions suggest a short-lived military settlement with storehouses. (September 23, 1935; 4:55 P.M.; altitude, 1,525 meters; 1/140 sec.; orange filter.)



A. THE SALT DESERT OF INNER IRAN

To one flying 5,000 feet above them the salt bogs of the Dasht-i-Kavir offer a fascinating spectacle of changing *moiré* in tan and white; but if the engine had quit it would have meant the last landing of the "Friend of Iran" and its crew. (September 23, 1935; 7:50 A.M.; altitude, 1,525 meters; 1/140 sec.; orange filter.)



B. TURUT, A TOWN IN THE SALT DESERT

On a tongue of solid land, south of the Salt Desert of Damghan, lies this strange little town. It owes its existence to a thread of sweet water and to a patch of fertile soil cultivated to the last inch. (September 23, 1935; 8:10 A.M.; altitude, 610 meters; 1/140 sec.; orange filter.)



GIRDKUH, A FORTRESS OF THE ASSASSINS

Beautiful though sinister are the landscape and even the very sky which form the setting for the cylindrical rock once crowned by a castle of an infamous sect. Walls of the fortress and of water basins are still standing on the almost inaccessible summit, and a double defense wall incloses the base of the rock talus. (*September 22, 1935; 8:52 A.M.; altitude, 305 meters; 1/140 sec.; orange filter.*)

ABOVE THE ZAGROS SUMMITS AND THE PLAIN OF ELAM

IN OCTOBER, 1935, the Rayy Expedition temporarily turned into a flexible exploration expedition for the American Institute for Iranian Art and Archaeology. Mrs. Christian R. Holmes and Mr. Carl Holmes were the patrons of the explorations in unknown Luristan. Dr. George C. Miles, the assistant field director of the Rayy Expedition, had explored with the writer the valleys of Rumishgan and Saimarrah during the preceding year, and the Rumishgan mounds had been selected for the test excavations to follow.

The expedition spent a month and a half in the valley of Rumishgan. A wealth of new information and material was obtained from the ground, while the "Friend of Iran" was the observer and scout of the expedition. The quietness of the dawn was nearly every morning split by the roar of its motor as we rose above the magnificent relief of the mountain panorama, struck by the first rays of the sun. From Rumishgan we radiated in all directions (see maps on end papers). Kirmanshah and Kangavar were the northern limits of our flights. From the southwestern slopes of the Kabir Kuh we could see the Mesopotamian plain beyond the border of Iran. To the east and to the south we crossed the entire mountain country on our commuting flights between Rumishgan and Persepolis.

It was an extremely strenuous time for Lewin Barringer, who had to pilot the ship across some of the roughest country imaginable. At times there were no spots for hundreds of square miles where he could have landed the ship in case of an emergency without wrecking it. In November the storms began. Billowing clouds blocked our ways. Solid sheets were spread over the jagged summits of the Lurish mountains and forced us to wind our way through the valleys hoping for a hole in the clouds to shoot through and so to cross the ranges. There was no radio that could tell us that Rumishgan was covered by sheets of clouds. The pilot had to fly blind, swooping down to the harbor through a sea of cotton or through sleety squalls. It was a test time for all, and thanks to the skill of pilot and mechanic we could remember it as one of our most beautiful and fruitful experiences.

SOUNDINGS IN THE RUMISHGAN VALLEY

We show first a ground view (Pl. 48) of our camp and "airport" at Chigha Sabz ("Green Mound"). Between the wings of the airplane the Lurish diggers are seen at work testing the

gentle south slope of the hill. George Miles or James Gaul is on mound duty supervising the work and recording the finds, while the linguistic virtuosity of Baba Khan, the foreman, has at times encouraging results in speeding up the digging.

At the camp table Mary-Helen is just being approached by a sick Lur. She is the camp doctor, pharmacist, and superintendent, caring for sick and well alike. Quinine against malaria, boric acid for eye inflammations, and medicines for the stomach are the most common remedies to relieve the ills of the natives. At times the two soldiers attached to us would have to keep dozens of women, children, and men waiting in line to prevent them from telling their tales of woe in unison.

The airplane, with cowling removed, is just getting its "twenty-hour test." When flying over long stretches of "rough bottom," we appreciated Fred Lillich's care and mechanical ability.

The mound of Chigha Sabz contained many burials with attractive vessels and bronze objects of the time between 2500 and 2000 B.C., an underlying stratum with ceramics similar to the earliest wares of Iran, and on top a cap of remains of the 1st millennium B.C. with strange human idols and animal effigies of baked clay. The most beautiful find, symbolizing the culture of the virile Zagros people, was a cylinder seal engraved with a spear-throwing hunter who is mounted on a rampant horse in pursuit of an ibex.

In the mounds of Kamtarlan (Pl. 49), where the Rumishgan tests started, well equipped graves of the 3d millennium B.C. gave us ceramics and other finds of two cultural subphases. The earlier vessels were painted with red-brown partridges, ibexes, and so forth on yellowish brown ground, while the somewhat later ware excelled in form. Elegant tripod vessels are the index types.

The excavations in the Rumishgan valley filled a gap on the archeological map; but it is self-evident that in this book we can merely touch the results, which will be described in a separate publication. One point we want to mention before returning to flights: Although we uncovered more than a hundred burials during our Rumishgan soundings, not a single bronze of the elaborate "Luristan type" occurred. The famous Luristan bronzes with few exceptions belong to the first half of the 1st millennium B.C.

The instructive oblique and vertical views of the Kamtarlan soundings show the great advantage of flat alluvial ground or loess for aerial observation. Every irregularity on the surface is marked on these pictures. We were oddly interested in stones scattered about in groups on the Rumishgan valley bottom. When the dawn patrol circled and zigzagged, after the first rays of the sun had struck the surface, our eyes were glued to these stones. The explanation for our peculiar behavior is quite simple. Nature had not provided the flat expanse of Rumishgan with stones; they had been carried there by human hands. Stones on the ground meant buried fortresses, dwell-

THE ZAGROS SUMMITS AND THE PLAIN OF ELAM [41]

ings, and cemeteries of the ancient settlers. The site of Mirvali, roughly northeast of Chigha Sabz, was found on account of its debris of boulders. Painted sherds of the 3d millennium were gathered beside rifled tombs, and tests revealed further burials of this period. On the oblique view of Kamtarlan, near the tent camp, groups of stones can plainly be seen on the ground. At the upper left on the vertical photograph the excavation of this spot, which we called Kamtarlan II, is seen well under way. The foundations of walls and many well equipped burials were here found.

One trench, 160 meters long and subdivided into recording units of 5×10 meters, sufficed to test the mound Kamtarlan I. To train and supervise the crew of Lurs we took with us from Rayy ten of our best laborers, who had been working with the expedition since the beginning of its excavations at Tepe Hissar. The age-old conoid felt cap of the Near Eastern mountaineer, worn by the Lurs, has since been displaced by the *kulāh farangī*, the "French" or occidental hat. This change is in line with the modernization policy of Riza Shah Pahlavi. He is forcing the Lurish nomad to settle and to cultivate the soil. Tribal warfare and brigandage are almost things of the past, and the Shah's Luristan forces see to it that this pacification shall not be merely temporary.

Chigha Bal ("Big Mound"; Pl. 50 A) is the most prominent site in the valley of Rumishgan. The high truncated cone rises from a gentle elevation which extends for quite a distance until it fades into the plain. Although it is the largest site of Rumishgan, we did not even start a test in this tempting hill. It is too big for a sounding expedition which aims at exploring an entire area. The cap of the mound consists of a fort of historical (presumably Sasanian) date, while the lowest strata certainly accumulated in prehistoric epochs. A Sasanian ruin, Zaghah, with rooms built of rubble and mortar, is situated to the right, that is, roughly east of Chigha Bal, outside the photograph. Two newly constructed villages of mud-brick houses are near the mound. In summer, however, the Lurish villager, still unaccustomed to his rise from nomad life to sedentary existence, prefers to live in a speedily assembled brush shelter which he calls *kulāh*, a "hat," somehow more closely related to the black tent of his nomad days.

PAST SHUTURAN KUH TO TEPE BURM

We had flown above and across an infernally rough though scenically magnificent landscape and approached Shuturan Kuh from the direction opposite to that of Plate 50 B when the tachometer or revolution-indicator went suddenly insane, jerking and whirling on its dial; but the motor roared on, ignoring the strange gyrations on the instrument board. There are eternal snow patches on this mountain, which rises about 14,000 feet above the level of the Persian Gulf. The opposite slope is just as rough as the eastern grade here shown, and the valleys are purple canyons with vertical cliffs. In one of these precipitous canyons, cut by a tributary of the Ab-i-Diz, Riza Shah

Pahlavi's trans-Iranian railroad was under construction. It now joins the Persian Gulf with the Caspian Sea.

We had crossed a saddle of the mountain and swept into a broad and fertile valley filled with patches of cultivation (Pl. 51 *B*). In the distance, to the southwest, glistened the snow-covered summit of Qalyan Kuh ("Water Pipe Mountain"). Before turning to the northwest in order to comb this promising valley as far as Burujird we circled over its southeastern end and discovered an unusually large mound, which was at once recorded by the camera. We wanted to have a closer look at what appeared to be the main site of the area. We circled lower and finally landed near the mound and the village half inclosing it (Pl. 51 *A*). We found that we had crossed an ethnic border of Luristan. Bakhtiari, most of them healthy and handsome people, inhabit the village of Burm, as they call it; and the same name was given to the mound or *tepe* which in due time will swallow the prosperous little settlement—another layer of its growth. After enjoying the hospitality of the friendly and courteous Bakhtiari we combed the huge mound, about 20 meters high, by climbing it in spirals and gathering the telltale bits of ancient pottery. There were many fragments dating from prehistoric to Islamic times.

RUINS IN THE VALLEY OF THE SAIMARRAH

Through the pass called Millah Dar and down a tortuous, slippery mule path George Miles and the writer had once ridden from Rumishgan to the valley of the Saimarrah. Tired out, at the end of the day we had reached our quarters for the night near the bank of the river. A year later, in five beautiful minutes our airplane traversed the same distance! The Saimarrah valley with its magnificent scenery of rocky ranges rising in steps to the Kabir Kuh was often the aim or the first leg of our flights from Rumishgan. At that time we did not yet have the maps of the Survey of India at a scale of 1:253,440, and Jacques de Morgan's "*Carte de l'Élam*" at 1:750,000¹ was at times a valuable guide and always a reminder of the exploits of the great Frenchman.

To judge by the frequency of mounds and ruins in that broad part of the Saimarrah valley which extends southwest of Rumishgan and parallel with the latter, this area must have played a considerable role in the ancient history of Elam. Our flights along this river from its precipitous gorges in inner Luristan to the plain of Elam as far as famous Susa showed beyond doubt that the Saimarrah valley was the principal passage for the cultures of the mountains and of the plain of southwestern Iran. Not as important as the Saimarrah, but likewise geographical media of cultural exchange, were the valley of the Kashgan Rud, a tributary of the Saimarrah, and the less accessible valley and canyons of the Ab-i-Diz.

While in our time only small villages and forts of former tribal chiefs occupy the valley of the

¹ In his *Mission scientifique en Perse ... Cartes ...* (Paris, 1895).

THE ZAGROS SUMMITS AND THE PLAIN OF ELAM [43]

Saimarra, it appears to have been quite densely settled four to six millennia ago (cf. Pl. 54). We landed at another mound called Chigha Sabz and found well modeled painted ware of the 4th millennium. Our Plates 52 and 53 show a later ruin of respectable size, Dar-i-Shahr, a town that flourished under the Sasanians and during the beginning of the Islamic period. We found a considerable number of Sasanian ruins in the Saimarra and Rumishgan valleys.

The vista in Plate 52 shows the topographic environs of Dar-i-Shahr. It is situated in a side valley of the Saimarra surmounted by the northeastern foothills of the Kabir Kuh, which forms the sky line. Very similar valleys extend to right and left of this picture and end in similar defiles, cut through the same sharp-crested, jagged ridge here seen. All of these natural rock gates seem to have been fortified in some manner. In one case regular cliff houses, oddly resembling the cave dwellings of the Pueblo Indians, protect such a narrow defile. The close-up of Dar-i-Shahr (Pl. 53), taken during a steep bank of the plane, shows the larger part of the town ruins, sections of its streets, individual buildings, and even the contours of many rooms. If the device for vertical photography (see p. 4) had been in our hands during the Luristan explorations, we would be able to show a clear-cut aerial map of the ancient town.

Tepe Katkhuda Kalandar ("Mound of the Village Chief [named] Kalandar") is the name of the site in the lower center of Plate 54. Carrying on its flat top a modern village fort, it is one of the largest mounds we saw during our Luristan flights. It is certainly the most prominent site in the valley of the middle Saimarra. On de Morgan's map of Elam and on Dr. George G. Cameron's map appended to his *History of Early Iran* (Chicago, 1936) the ancient Elamite town of Madaktu is placed in the vicinity of Tepe Kalandar. Cameron, however, told us orally that according to documentary sources Madaktu was bounded by a river on two sides. The aerial photograph records a bend of the Saimarra at some distance from the mound; and a creek, in case it could have been referred to, flows along only one edge of the hill.

At any rate, whether or not the mound incloses Madaktu, it is a worthwhile object for an excavation. In a few months a deep test could determine the sequence of its strata and the advisability of expansion. Fall is the best time for work in the trying climate of Saimarra. Being about 2,000 feet lower than Rumishgan, it is infernally hot in summer. In winter the rains would often interrupt the excavations, while in spring the fording of the rivers, especially the Kashgan Rud, is at times impossible.

CROSSING THE PLAIN OF ELAM

On two exploratory flights and on several cross-country trips between Rumishgan and Persepolis we combed the plain of modern Khuzistan, ancient Elam. I have pointed out on various occasions the peculiar fascination of flat alluvial deposit for the aerial observer. The disturbing

natural details of the mountainous landscape are missing. The alluvial plain contains no large stones. Watercourses, flowing or dry, dunes, modern constructions, and patches of cultivation are the only features disturbing the otherwise ideal flatness of its desert surface. I go so far as to say that every disturbance of the alluvial soil due to ancient constructions is visible to the aerial observer during one or another season of the year. I except those parts of the alluvium which are exposed to periodic inundations and accumulate unusually thick deposits on top of former occupations. Parenthetically speaking, it means, of course, a great relief for the pilot to fly over a landscape where he will always find a landing ground.

Out of innumerable sites scattered about in the plain of Khuzistan, few have been tested, and only one is being excavated—Susa, the famous capital of old Elam. Here Jacques de Morgan, preceded by Loftus and Dieulafoy, started work about forty years ago; and at present de Mecquenem, mainly assisted by Dr. Unvala, continues the regular winter dig under the patronage of the Paris Louvre. Though de Mecquenem was pleased when we gave him the photograph of the enormous site of Susa shown on Plate 55, we were not satisfied with its effect. Cloud shadows disturbed, and the time of day was advanced. Perhaps at some future time we shall be able to make a more valuable aerial record of his site. The trench of de Morgan, about 20 to 30 meters deep, is seen as a broad gash in the principal elevation. Faintly outlined, the contours of Achaemenian structures are visible on the cloud-darkened mound, beyond the fortress housing the expedition. The village of Shush, with the “Tomb of Daniel,” marked by its conoid top, is to the left of the main mound.

Another famous spot of Khuzistan is the town of Shushtar, shown on Plate 56. Here a barrage dams a branch of the Karun River, the Ab-i-Gargar, an artificial channel dug for irrigation purposes and also for defense. According to legend, prisoners of war, Romans of Valerian’s army, supplied to Shapur I the human material for his weir and bridge which are on the opposite side of the town. The barrage shown in our illustration may also be of Sasanian origin.

Canals tunneled through the living rock carry the water of the river around the dam to the foaming spots seen downstream on the photograph. Now, as in times past, busily spinning millstones are driven by the rushing waters and grind the wheat for the people of the town. Water buffaloes in their favorite element are seen partly submerged in the upstream branch of the river. A little mosque with yellow and turquoise-blue tiles stands at the far end of the bridge, while on the hither bank the patch with many parallel irregularities is one of the final resting-places of the people of Shushtar. They lie neatly oriented, head to the northwest, feet to the southeast, face turned southwest to Mecca and salvation.

According to Ibn al-Muqaffa^c, as stated by Paul Schwarz,² Shushtar (“Tuster”) compares

² *Iran im Mittelalter nach den arabischen Geographen* IV (Leipzig, 1921,) 352.

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in antiquity with famous Susa. In Sasanian and early Muslim times the town was renowned for its silks and brocades. This textile industry had apparently been introduced by artisans transplanted by the Sasanians from Mesopotamia.³

POINTS EAST AND NORTH OF RUMISHGAN

Once every week we had to fly to Khurramabad to report to the commander of the Luristan forces, Colonel Razmara at first, afterward Colonel Davarpanah, and to submit the flight program of the week to come. We are deeply indebted to these courteous and helpful officers. During the preceding year Colonel Razmara had also aided George Miles and myself with admirable speed and knowledge of the area under his command to organize our trip through Rumishgan and Saimarra.

Khurramabad was the source of certain supplies for camp. Most of us were tired of turnips, the only vegetable to be had in Rumishgan. Hence the exploration ship turned into a truck on its flights home from town. Spinach and radishes were stuffed into baggage space. Cabbages, potatoes, melons, and bottles of beer, together with tins of Anglo-Iranian "A-7" (74-octane) airplane gas, filled the rest of the cabin. Lewin and Tahiri also made some freight trips with excavated antiquities, relieving the final transport. Even so, about a hundred pack animals were required in the end to get the equipment and the rest of the antiquities out of Rumishgan.

Much to our surprise, and presumably to the surprise of other archeologists also, our ground examination of the mounds at Hulailan, Kuh-i-Dasht, Dumavizah, and Tepe Vashiyan (all marked on the map of Luristan inside the back cover), followed by the comparison of their ceramics with those of Saimarra and Rumishgan, showed a very definite homogeneousness of culture, at least toward the end of the 3d millennium. I admit we had expected rather distinct local developments paralleling the geographic conditions in this rough mountain country, which is subdivided into many separate valleys. Yet on comparison of our Rumishgan finds with those from Tepe Giyan near Nihavand, published by Contenau and Ghirshman,⁴ the close resemblance of the material cultures of these two widely separated areas in the second half of the 3d millennium B.C. is striking. The culture penetration and interchange in this mountainous territory had been much faster and more thorough than we would ever have imagined. Certain local peculiarities will probably still be determined, and certain foreign culture currents will be found to have touched only parts of Luristan; but the fact remains that at least during the 3d millennium a homogeneous culture existed in those areas examined so far.

It was unbelievably beautiful to take off with the rising sun, circling first above awakening

³ *Ibid.* p. 354.

⁴ *Fouilles du Tépé-Giyan ... 1931 et 1932 ...* (Paris, 1935); cf. also Herzfeld in *Iranische Denkmäler I B* (Lfg. 3/4; Berlin, 1933).

Rumishgan and then roaring on to parts unknown. Over an interesting site the maneuver of Tepe Burm would be repeated. Falcon-like the "Friend of Iran" would circle above its prey. Lewin would spot a good landing ground, while Mary-Helen was thrilled with the beauty of the landscape, and I with the mound below. In lower and lower spirals the plane would approach the earth, searching, dragging, zooming, circling, and finally landing on the element that built it, but not its own. Out of nowhere, in no time at all, shepherds, tribesmen, gendarmes, officials would appear and crowd around, ever friendly, cheerful, and so curious!

Each landing was risky; but our confidence in Lewin's ability was never shaken, and the "Friend of Iran" stood up splendidly under abnormal strains. The Waco and its Jacobs engine deserve their praise. The landings at the mounds in the valleys of Hulailan and Kuh-i-Dasht were quite smooth; but two stops in the Dasht-i-Khavah were rough indeed. As a matter of fact I leaned over to see whether the wheels and the landing gear were still with us after we had taken off. In the Dasht-i-Khavah we gathered painted prehistoric sherds on Tepe Dumavizah. When combing the environs to the west we saw valleys quite promising for future ground explorations. But the sun was approaching the horizon, and we knew the camp was getting worried. So the plane turned its nose toward the southwest, Rumishgan, and home.

Our flights to the north touched an extremely important mound right in the center of the little town of Shahabad (formerly Harunabad) on the age-old royal road from Babylon to Median Ecbatana (modern Hamadan) and on to Rhages and the east. Between the town and a sugar factory, one of the symbols of the progressiveness of Riza Shah Pahlavi, the "Friend of Iran" made a smooth landing; but dear Colonel Dumbali, the chief of the place, thought that the plane had crashed, and he and aides came racing in a car to help us. He was relieved when he saw us safe and sound and showed us antiquities found in the large mound when the town was being expanded and beautified. They included a huge bronze vessel with tripod legs and spout, also pots painted with bands. However, the most important discovery we made when examining the lower slope of the site. Here we found very attractive early 3d- or 4th-millennium sherds painted with interesting geometric patterns.

Mahi Dasht ("Fish Plain") is the name of a long basin west of Kirmanshah. In 1934 George Miles and the writer had combed its northern part, crisscrossing it by car. Innumerable sites, faint elevations and high mounds, fill this valley, which must be considered as an important archeological area, a borderland of several cultures. There are red, handmade potsherds closely resembling early Anatolian ware. Yellowish brown fragments with dark core remind one of the early Hittite pottery of Alishar ("Period II") and Boğazköy. Painted bits have Luristan affiliations. In addition one should expect here an overlapping of the Mesopotamian and inner Iranian cultures. Certain plain sherds actually seem to point to the western lowland.

THE ZAGROS SUMMITS AND THE PLAIN OF ELAM [47]

We flew across the Mahi Dasht in its entire length. Its southern half also shows several interesting spots. The valley is an ideal territory for a testing expedition, at first neglecting the higher deposits while sounding the easier sites and then concentrating for large-scale excavation on one of the largest mounds which, according to the information derived from the tests, contains important layers.

Although in rainy weather a lump of dirt or a stone broke the wooden propeller of the airplane at the Kirmanshah airfield during Lewin's last flight, the port is excellent as a rule. Here we had a temporary base for flights to the famous monument of Darius at the Rock of Bisitun (Pl. 101) where the great king immortalized his defeat of nine rebel kings. From here we flew to the region of Dinavar and across the rock massif of Taq-i-Bustan (see Pl. 97) to look for traces of the Luristan bronze culture in the territory of the Pairavand tribe.

On one of our flights we tried to find and photographically record the site of Tepe Giyan, where the French had worked with great success (see p. 45). Circling above the valley of Niha-vand revealed many good-sized mounds, but we could not identify the particular site for which we hunted. Midday was near, and the air turned bumpy. Whirligigs parading and dancing on the ground below visually showed the thermal currents rising. Clouds helped to make the air more restless. Photographing would have been just haphazard snapping from the jerking and dancing plane, which dropped with the cold air rushing down and rebounded with the thermal currents. At any rate, there could be no more accurate observing, and Lewin made a beeline for the port. There were magnificent cumulus formations above the ranges ahead. He pulled up the nose of the ship, and we climbed to enjoy their billowing, ever changing beauty from their own lofty sphere.

*PLATES 48-56 * WESTERN IRAN*



CAMP AT CHIGHA SABZ ("GREEN MOUND"), VALLEY OF RUMISHGAN

A wing of the "Friend of Iran" is spread over the excavation, which revealed interesting objects of the 3d and 1st millennia B.C. At the camp table Mary-Helen is seated with our two Iranian companions. A Lurish patient approaches her to be cured of his illness. Pilot and mechanic have interrupted the "twenty-hour test" of the plane to join the camp circle.

A. THE TEST OF KAMTARLAN MOUND I IN RUMISHGAN

(October 18, 1935; 7:23 A.M.; altitude, 151 meters; 1/140 sec.; yellow filter.)

B. VERTICAL VIEW OF KAMTARLAN MOUNDS I AND II

On *A*, to the upper left of the tent camp, a cluster of stones is marked. Stones in the silt of the alluvial valley mean human activities. On *B* this stony area (at left), which we called Kamtarlan II, is being examined. Many well equipped prehistoric burials were here uncovered. (October 28, 1935; 4:33 P.M.; altitude, 610 meters; 1/140 sec.; yellow filter.)

A



B



PLATE 50



A. CHIGHA BAL ("BIG MOUND"), THE LARGEST SITE OF RUMISHGAN

The truncated conoid mound was too big to be tested during a short season. It is, however, a promising site for some future excavator. (October 18, 1935; 7:27 A.M.; altitude, 214 meters; 1/140 sec.; yellow filter.)



B. SHUTURAN KUH AT THE BORDER OF LURISTAN AND BAKHTIARI LAND

An aviator calls this kind of landscape "rough bottom." There is no spot to land for hundreds of square miles. Shuturan Kuh in the foreground is about 14,000 feet high. Patches of eternal snow cling to its northward slopes. (October 27, 1935; 8:19 A.M.; altitude, about 4,000 meters above sea-level; 1/140 sec.; orange filter.)



A. LANDING AT TEPE BURM

About 20 meters high, the mound towers above the Bakhtiari village which in due time will form another layer of the hill. The "Friend of Iran" is the object of intense curiosity on the part of the friendly people, whose picturesque costumes Mary-Helen is busily recording with her Leica.



B. TEPE BURM IN THE COUNTRY OF THE BAKHTIARI

In the lower center of the mosaic of fields Tepe Burm rises above the village which partly surrounds it. Qalyan Kuh ("Water Pipe Mountain") with its snow-capped summit forms the sky line. (October 27, 1935; 8:30 A.M.; altitude, about 1,800 meters; 1/140 sec.; orange filter.)



THE SITE OF DAR-I-SHAHR IN THE VALLEY OF THE SAIMARRAH
(October 18, 1935; 7:05 A.M.; altitude, about 1,100 meters; 1/140 sec.; yellow filter.)

CLOSE-UP OF DAR-I-SHAHR

This town site shows that in former times important settlements flourished in the valley of the Saimarrah River, while during more recent centuries only small villages and nomads existed in its environs. The Kabir Kuh forms the horizon in Plate 52, while in the close-up we look in the opposite direction. (October 17, 1935; 7:49 A.M.; altitude, 458 meters; 1/140 sec.; no filter.)





THE MOUND OF KATKHUDA KALANDAR ON THE BANK OF THE SAIMARRAH

Students of ancient history place Madaktu, an Elamite town, near the large mound here shown. Near the upper margin of the photograph the Kuh-i-Ma'lah rises from the serpentine Saimarra River. (October 18, 1935; 6:58 A.M.; altitude, 549 meters; 1/140 sec.; yellow filter.)

SUSA, AN ELAMITE CAPITAL, IN THE PLAIN OF PRESENT KHUZISTAN

Few ancient sites are as famous as Susa, and few have added as much as this mound has to our knowledge of the ancient Near East. The modern village of Shush with the "Tomb of Daniel" is to the left of the principal elevation, which carries the fortlike quarters of the French expedition. (October 23, 1935; 8:12 A.M.; altitude, 534 meters; 1/140 sec.; orange filter.)





THE SASANIAN BARRAGE AT SHUSHTAR

Channels cut through the living rock, perhaps by Roman prisoners of Shapur I, still drive with their gushing waters the flour mills of modern Shushtar. (*November 6, 1935; 12:22 P.M.; altitude, 305 meters; 1/140 sec.; no filter.*)

PART II
SEASON OF 1937

AN AERIAL RECONNAISSANCE TO THE GURGAN PLAIN

ALL CLEAR?

FROM the Department of Antiquities to the Minister of Education, to the Bureau of Supervision, to the Chief of the General Staff the application for this flight had wandered, to be submitted finally to His Imperial Majesty. Back it came through the same winding channels: Permission granted. His Majesty had remembered his promise (p. 7).

May 8, 4:30 A.M. Dawn was just beginning when one of our expedition's good Buicks (the best car for this country) entered Dushan Tepe airfield with the crew of the Aeronautical Department. Right behind us came the car of the British legation, bringing our good friend Lady Seymour, the wife of the British Minister, and "Hukie," her air-and-archeology-minded little son. He wanted to see the take-off.

Needless to say, the Waco was in perfect shape. Fred Lillich was still mothering the ship. William G. Benn, its new captain, was to be initiated on his first exploratory flight over Iran. Many hundreds of hours in the air had taught him most of our observation tactics, and he in turn later taught us many things. Lieutenant Nojumi of the Iranian Air Forces had been ordered to accompany us in accordance with the regulations guiding our aerial activities.

Loading did not take much time. There was the excellent Zeiss aerial camera (Fl. K. 25), filled with a roll film of a hundred 13×18 cm. exposures. Next came the indispensable telescope which, when attached to the Zeiss device for vertical photography fixed above a hole in the airplane bottom, defines the extent of the landscape to appear on the film. Maps of northeastern Iran, an iron ration of concentrated foods, a medical kit, canteens with boiled water, miniature overnight bags, weapons, and a 9×12 cm. camera for ground photography completed the equipment. Still it was quite a load, considering that there were four persons in the cabin, seventy gallons of gasoline in the wings, and eighteen gallons in the spare tank built into the baggage compartment. The metal propeller too added thirty pounds of weight, as compared with a wooden one. However, after two wooden propellers had been broken, the question of added weight became secondary.

5:10 A.M. The pilot is ready to "warm her up." "All clear?" "All clear!" "Contact!" The engine roars. It sounds "sweet," thanks to Fred Lillich. "All aboard!"

5:20 A.M. Altitude (of airfield), 4,400 feet; temperature on ground, 62° F. Full throttle, the brake clanks down, we make a short dash across the field, then we are off. At the hangar, down below, a few specks, among them a tiny one—Hukie, probably thinking of becoming an aerial archeologist.

CLOUDS, THE FLYER'S ENEMIES

The weather was not very promising. Beyond snow-capped Sar-i-Tauchal dark clouds filled the northern and western sky. But we were hopeful, since lighter streaks showed eastward. Tehran was fast asleep when we left its mosaic of gardens and headed northeastward. Our first aim was Mount Damavand, whose 18,500-foot peak, covered with eternal snow, is often our landmark for 100–150 miles. However, this time we could not see it until we had wound our way through many valleys, dodging snow-capped ridges and sneaking through passes. We wanted to photograph the magnificent volcanic cone, but it was wrapped in dark clouds. Since photographs were out of the question, we turned, crossing the southern Elburz range again, on our way back to the fertile zone between the mountains and the "Salt Desert." However, when we reached the plain the log expressed our resignation: "6:32 A.M. Altitude, 12,500 feet; temperature, 34° F.; above Samnan, no relief of ground, no hope for photographs or observation; choose southern route for Tehran."

On May 10 the maneuver was repeated; but we skipped Damavand and flew in a gentle arc across the Elburz range to Samnan and thence to Damghan. We circled our greetings to the little town. Once more we looked down at the excavation squares in Tepe Hissar. Then we turned northward, heading for Gurgan, formerly Astarabad. Winding our way through the attractive valley of Chashmah-i-^cAli and Chahar Dih (Pl. 58) we finally gained an open view of the scene beyond the Elburz—an endless "sea of cotton." Somewhere, invisible below the bottom of this white sea, lay Gurgan and the Turkoman steppe, submerged in darkness, while the sunward surface spread in silvery fluffiness.

It was hopeless. We turned and flew back to Damghan, making a detour over the shrine of Bustam (cf. Pl. 43) and over the Shahrud oasis, where some scholars look for Hecatompylos. Two kilometers west of Damghan our landing field prepared in 1935 by Fred Lillich and Baba Khan still showed its inviting white circle and the corner angles. Captain Benn made a perfect landing, and soon the Damghanis crowded around the "Friend of Iran."

We were anxious to get to our destination, so in the afternoon we made one more attempt to reach the steppe. In thirty-five minutes we covered the distance from Damghan to the northern edge of the Elburz range. The Damghani who wants to cross the mountains on the dangerous mule path to Gurgan needs three days for his trip.

Before turning, beaten again, we recorded photographically the cause of our defeat and called

the picture "Shore of the 'cotton sea' " (Pl. 57). The "shore line" is formed by the black crests of the highest ranges. Black storm clouds swept into the plain of Damghan as we landed. Tail into the wind, the "Friend of Iran" was well staked before we left it to the protection of the police and looked for quarters for the night.

CHANGE OF TACTICS

In two frontal attacks we had been miserably defeated by our enemies, the clouds. We changed our plan and decided to reverse our route and to examine first the area south of the Elburz, then try to get into the steppe from the east.

On May 11 we took off toward the hazy east. It did not look like "photo-weather." Again we combed the relatively fertile zone between the Elburz and the "Salt Desert" for traces of elusive Hecatompylos—without success. The oasis of Shahrud slipped by. At Mayamai, where we had intended to land, the field of the former Junkers air line looked too wet. Then came stretches of drab desert country with veins of temporary salt creeks. For many miles there were no traces of ancient occupation except a few rectangular citadel formations far apart. In the region of 'Abbasabad and Pul-i-Abrisham the desolate "Salt Desert," a wavy pattern in tan and white, spread to the foot of the mountains and through openings into the plains between the ranges.

We had been told of city ruins at Sudkharu. Village deposits may be there. A dash to green village clusters in the south, marked by a triangular detour on the flight map, did not reveal any sites of particular importance. Approaching Sabzavar the oases combined into green clusters, finally to form a continuous pattern of green and ribbed tan mosaics of cultivation. A few minutes after passing the famous minaret of Khusraugird, Sabzavar appeared, a maze of crowded houses picturesquely girdled by a polygonal town wall with many towers. Circling low, we looked for flat and uncultivated spots and landed finally 3 kilometers south of town, on top of a village mound nicely leveled by time and the elements.

Half an hour later, nearly mobbed by the friendly but curious Sabzavaris, we took off again, heading north toward the plains between the Elburz ranges and toward Shahr-i-Bilqis, marked "ruins" on the map of the Survey of India. In winding course we crossed the passes over the eastern end of the Jaghatay Mountains and the valleys of Juvain and Safi'abad. In spite of our serpentine it took us only a little more than half an hour from Sabzavar to Shahr-i-Bilqis ("Town of the Queen of Sheba"!). Historians believe that Shahr-i-Bilqis, in the plain of Isfarayin, is the remnant of the medieval town of Isfarayin (earlier called Mihrajan), which "was very populous, and had good markets."¹ However, though from our bird's-eye perspective we clearly saw the contours of its numerous houses and its turreted city walls, it is a dead town and has

¹ Le Strange, *The Lands of the Eastern Caliphate*, p. 393.

been so for at least seven hundred years. Although the sky was overcast and also the time of day was advanced, our excellent Zeiss camera neatly recorded in obliques and verticals "Queen of Sheba's Town" (Pls. 59-60). Its irregular, roughly rectangular defense wall incloses several outstanding buildings in addition to the remains of less pretentious private quarters. A roughly rectangular citadel with many towers adjoins the town.

The northwest looked gloomy, with its gray sky and with "cotton wads" in the valleys. Hence we did not even try to make another attempt for the steppe just now. We turned and headed straight for Mayamai—and for our store of A-7 airplane gasoline.

GURGAN AT LAST

That night we of the crew slept in a room—not much bigger than our cots—perched, penthouse fashion, on top of a teahouse roof. Rain drove us under cover after I had dreamed of resting under the far-spreading branches of a beautiful old plane tree.

May 12, 6:02 A.M.; 4,000 feet; taking off toward NE. We flew northward to an area called Kalatah, then eastward across a nameless and lifeless desert traversed by the Kal-i-Mura River and by countless veins of intermittent salt creeks. In this desolate wilderness, at a point where once a caravan track had crossed the Kal-i-Mura, a deserted caravanserai called Ribat-i-Pul-i-Abrisham stands near a broken bridge. We followed the river toward the southeast until we found the valley again, northeast of the present highway bridge, Pul-i-Abrisham, where on the day before we had noticed some interesting town ruins. Again verticals and obliques recorded the contours of the former town (Pls. 61-62), partly buried below the fields and houses of a prosperous village thriving on its ruins in spite of the fact that our maps ignore its existence.

Now we took a beeline for Jajarm. The geographic position of this town somehow appealed to us. We were not disappointed. A fine circular mound forms the nucleus of the modern town oasis, which copies the form of its ancient core. There are several more *tepe*'s (mounds) in the environs of Jajarm. The ruins of a fortress with a tower at each of the twelve corners are about 4 kilometers south of the town. Hexagonal ruins crown a hill spur west of it.

Jajarm was photographically recorded (Pl. 63), and, with the closing of the windows, the roar of the engine turned into a sweet and almost lulling drone. Our course was west-northwest. Once more we were bound for the plain of Gurgan.

Down below, mountains less bare and desolate than those bordering the inner Iranian plateau began to appear. Green blankets of meadows and wooded patches were spread over their northern slopes, turned toward the cloud-bearing winds of the Caspian. Soon we could see solid forests covering the slopes and valleys of the Caspian watershed. What a relief after the tan monotony of the plateau!

But now the critical moment had arrived. It almost seemed as though we were beaten once more. Before us spread again a blanket of cotton clouds, clinging to the southern border ranges of the steppe and hiding it from our view. A tan streak in the distance gave us hope. There, at least, was a hole in the clouds; and, after five decisive minutes had passed, we noticed that the cloud blanket was full of holes. Through them we saw the earth, now about 7,000 feet below us. We were at last above the Gurgan plain with its beautiful deep green fields and meadows dotted with bright red specks of village roofs.

Seven minutes after leaving the mountains a "matchstick" with a long shadow, 8,000 feet below us, induced Captain Benn to tap his facial protuberance and to say "right on my nose." He was punched for his conceit, though I admit it took good navigating to fly from Jajarm across sketchily mapped mountains and a cloud-covered plain to Gunbad-i-Qabus ("Tower of Qabus"), the "matchstick" mentioned above (Pl. 64).

For eleven minutes we descended in gentle spirals while circling the small modern town and its ancient predecessor, Jurjan or Gurgan, destroyed by the Mongols. Our captain looked for a landing field and finally touched the earth not far from the tower of Qabus the Ziyarid, who has slumbered here since A.D. 1012.

Nojumi, our Air Force lieutenant, convinced the chief of police that we were no Bolsheviks trespassing in this delicate border area, and after an excellent breakfast with the guardian of public safety we took off to tackle at last the main task of our flight.

A LIMES OF ANCIENT IRAN

Age-old was the feud between ancient Iran and Turan, that vast Siberian steppe country to the north and northeast whose hordes during its periodical convulsions beat like human surf against the mountain barrier of northeastern Iran and succeeded at times in surging through its passes. Their first objective was always the fertile belt between the Gurgan River and the northern slope of the Elburz chain. Hence one of the Persian rulers decided to block the gate of invasion and built a monumental defense wall across the entire steppe, from the Caspian Sea to the mountains in the east. The Survey of India map calls what remains of this rampart "Alexander's Barrier." But no such wall appears among Alexander's deeds, otherwise so well documented by his historians. It must have been built between the conquests of the Macedonians and the Arabs. The Turkoman calls the serpentine embankment Qizil Yilan, "Red Snake," because of its reddish tint.

The "Red Snake" was too tempting an objective to miss before we headed for modern Gurgan, formerly called Astarabad, which was to be the principal base of our reconnaissances. Four minutes away from Gunbad-i-Qabus, after we had crossed the Gurgan River, a reddish

streak accompanied by the white lines of modern tracks betrayed the course of the "Chinese Wall" of old Iran (Pl. 65). Deciding to record the "Red Snake" at once, we turned westward. Benn throttled the engine to "reconnaissance speed," just enough revolutions to keep flying; for hectic work started immediately. As soon as we reached the barrier we noticed rectangular forts abutting at irregular intervals the southern face of the wall remnant. These prove, of course, that the wall was built against a northern enemy, not vice versa. The garrisons of the forts were inside the area to be protected. Recording had to be done with terrific speed, since objects of archeological interest followed one another with bewildering rapidity. In addition to the registration of each fort, there were the contours of ruined cities along the Gurgan River. Bends of the latter and of the "Red Snake" had to be noted for correction of the map. There were ancient irrigation canals, a strange crater formation, and modern Turkoman villages. Photographs were taken of the "Red Snake," of forts, of city ruins (Pls. 66-67), and of the crater.

Then, about 5 kilometers before we struck the shore of the Caspian Sea, the great wall came to an end. There was no more trace of it in the dark and light *moiré* of the littoral belt. However, there is no doubt whatsoever that the builders of this monumental defense system had carried their wall up to the very shore of the Caspian. The gap simply means that since the construction of this fortification the sea has receded the distance between the end of the wall and the present shore.

On the following day, to finish our observations with regard to the "Red Snake," we examined the eastern part of the rampart, starting at the point northwest of Gunbad-i-Qabus where we had first struck it. Again the log records fort after fort, at irregular intervals, though usually about an hour's march apart. About 15 kilometers northeast of Gunbad-i-Qabus the barrier branches, the southern branch extending to the Gurgan River. This indicates that the latter was used, from this point in particular, as a second line of defense. As a matter of fact, the rampart from here on comes very close to the north bank of the Gurgan.

On the Survey of India map "Alexander's Barrier" stops where it finally strikes the river, according to this map 20 kilometers (in reality 33 kilometers) northeast of Gunbad-i-Qabus. But we crossed the green band of the Gurgan River at this point, and to our delight the wall did likewise, continuing in a straight line toward the northeast. After about 10 kilometers it crosses the Gurgan once more and thus returns to the north bank. But then, about 10 kilometers farther on, the artificial defense system of northeastern Iran comes to an end, to the best of our knowledge. It ascends the sharp crest of one of the foothills of the mountain massif and disappears where the mountains themselves become defensive ramparts. There is a chance, however, that tactically weaker sections of these ranges east of the east end of "Alexander's Barrier" were likewise protected by artificial defenses. But they would have been invisible to us. Solid clouds covered this area and filled the valleys to the east.

We had traced the great wall of Iran for a distance of about 170 kilometers, and we had counted thirty-one forts once holding the garrisons for this remarkable system of defense (see Map 2).

Returning to our first survey of this fortification, when we reached the Caspian end of the rampart the ship had been four hours in the air, and it was time to nose it toward Gurgan and gas. In a beeline and keeping just below the ceiling of low cloud sheets we dashed across the beautiful dark green pastures and fields of the fertile Gurgan belt toward its capital. The very fertility of this precious strip of Iran handicapped us when trying to find a landing field. In addition, low but for an airplane vicious stone walls inclose the cultivated plots. We had to circle for twenty-three minutes until the pilot decided upon a pasture and put the ship down about 3 kilometers northeast of Gurgan (Astarabad) at an altitude of 300 feet (i.e., 385 feet above the Caspian, which is below the level of the Black Sea).

There was no time to spare and no time to spare the pilot. On the following day we had to be back in Tehran, and a change of the weather would have frustrated our efforts. Hence we took off once more in the afternoon for what turned out to be a zigzag hunt for mounds.

TURANG TEPE, A KEY SITE OF THE GURGAN PLAIN

The archeological fertility of this patch of earth is amazing. The banks of the Gurgan River are covered with the contours of cities of ages past. Rectangular town inclosures (Pl. 68), mounds of all shapes and sizes (Pl. 69), and ancient citadel hills dot the plain. One is reminded of such centers of the ancient world as Egypt, Mesopotamia, and Syria when seeing this abundance of ancient occupation in the plain of Gurgan.

I am considering the results of all our flights in the Turkoman steppe when I state that one of the most attractive and promising sites is Turang Tepe, the "Pheasant Mound" (Pls. 70-71), about 17 kilometers northeast of Gurgan (Astarabad). It is regrettable that Frederick R. Wulsin could not continue his excavations after testing this mound in 1931.² Even apart from the so-called "Sumerian treasure"³ found in this mound,⁴ its topography suggests a royal site of antiquity. Its lofty "acropolis" rises about 30 meters above the plain and is inclosed by a terrace formed by successive towns. We saw no other site in the Gurgan plain combining such a high main mound with such an extensive town formation. Turang Tepe covers an ancient capital of the region.

It was delightful, though somewhat unsystematic, to chase from mound to mound and, circling overhead, to photograph characteristic *tepe* forms. Among them was Shah Tepe, a mound

² For his report see American Institute for Persian Art and Archaeology, *Bulletin* II (1932).

³ Actually a hoard of "Hissar IIIC"; cf. Schmidt, *Excavations at Tepe Hissar, Damghan*, pp. 171 ff.

⁴ See account by M. I. Rostovtsev in *Journal of Egyptian Archaeology* VI (1920) 4-27.

well tested by T. J. Arne.⁵ But, if we were ever to excavate a mound in the Turkoman plain, we should head straight for Turang Tepe. It certainly contains the answers to many questions regarding the prehistoric cultural development of the plain and its relations with the Iranian plateau.

LANDING FOR POTSHERDS

The weather did not look too good on the morning of May 13. The sky was overcast, and from a 300-foot ceiling rain squalls were falling. However, there was a lighter streak in the north where we intended to fly. So off we went. We headed once more for the mouth of the Gurgan River, where we had stopped our combing on the previous day. After circling over a fleet of fishing boats, presumably hunting for sturgeon and its caviar, we turned east to map the sites on the river. For about 20–25 kilometers there were hardly any traces of ancient or modern occupation. Then my pencil raced across the log sheets again, to keep pace with the visual observations of towns, *tepe*'s, citadels, direction changes, irrigation ditches, villages of the Turkomans, and so forth.

We followed the river as far as Gunbad-i-Qabus. Then we turned again to "Alexander's Barrier," where we had first struck it, and followed it as described above. It was strange to see the green fertility of the belt south of the Gurgan and then beyond its north bank the steppe fading into tan desert. This contrast, in plain words, shows the reason for the great wall. It protected the tiller of the soil against the nomad of the steppe and desert.

After locating the end of the "Red Snake" we turned and for a time retraced our sky track. Now we looked for an attractive and representative mound. We wanted to determine the ceramic and therewith the general cultural relations of the east end of the Gurgan plain with the mounds examined in the west and with our Tepe Hissar near Damghan, beyond the mountains to the southwest. Soon we noticed just the mound for our purposes (Pl. 72 A). Situated at the easternmost end of the plain, roughly triangular in outline (about 80×150 meters), it rises about 10 meters above its surroundings. Fortunately there was a flat spot about 200 meters from the hill. Though covered with tall grass and therefore dangerous for landing, since holes or ditches might be hidden there, the pilot made a perfect landing (altitude 400 feet), and the hunt for sherds began.

Mazarliq Tepe the villagers called our mound. It proved to be very instructive. Fine red ware typical for historical but pre-Islamic periods identified the upper stratum. Gray pottery of "Hissar II" type is certainly represented, and painted ware with black geometric patterns on red seems to be characteristic for the earliest layer shown by surface sherds. The ceramic sequence in its main features exactly parallels the stratigraphy of the western steppe, and the gray ware is

⁵ See Arne in *Acta archaeologica* VI (København, 1935) and his "La steppe turkomane et ses antiquités," *Hyllningskrift tillägnad Sven Hedin* (Stockholm, 1935) pp. 28–43, which includes a valuable archeological map of the Gurgan plain.

identical with that of the middle stratum of Tepe Hissar. Once again we had found traces of the people who had invaded the age-old settlement of Tepe Hissar, introducing an advanced metal culture and displacing the painted pottery of the indigenes with the plain gray ware prevalent in the northern lowland.

There is a desperate entry in the log: "*Tepe's everywhere*," made after taking off at Mazarliq Tepe and referring to the country southwest of this mound. It expresses the hopelessness of trying to map the Gurgan plain in twenty-four hours. It could be done in four days, that is, about twenty hours of strip-plotting.⁶ At any rate, the plain to the east of Gunbad-i-Qabus is as prolific of ancient sites as the Gurgan (Astarabad) area. We photographed in the eastern plain a mound with a promising town platform, also town sites of historical periods, with citadel and city wall (cf. for instance Pl. 68), the latter forming sometimes a true rectangle, sometimes a polygon. Gunbad-i-Qabus with its famous tomb tower (Pl. 64) was snapped from all directions. The tower stands on a roughly rectangular mound from which extends a town inclosure of unknown date, outside the limits of the modern settlement.

Returning to our base we followed the foot of the Elburz range and crossed the highway which is eventually to connect Gurgan with Shahrud,⁷ where it turns into the mountains. From above, the dense primeval forest, the *jangal* ("jungle"), appears to flow down in dark green cascades from the pass into the plain with its lighter tints of green cultivation mosaics, while streaks of tan desert form the border beyond in the inhospitable north. We dashed once more to our favorite mound, Turang Tepe. Near by a flat-topped *tepe* with a pronounced fortress formation on its truncated summit was also shot. This was the end of the reconnaissance in the Gurgan plain.

GURGAN-TEHRAN

There was an hour's rest on the Gurgan field. Then we spiraled up from 300 to more than 11,000 feet through sheets of clouds until, above them, we could cross the formidable mountain barrier (Pl. 72 B) which separates the blessed subtropical belt of the Caspian from the barren Iranian highland where towns and villages are oases, where every flower and every tree are treasured, and where water is liquid gold.

Once again we crossed the valley of Chahar Dih and, in the southern foothills, Girdkuh, the impregnable stronghold of the Assassins (cf. p. 36). In a gentle arc we followed once again in the opposite direction the route of Alexander across the semidesert and desert stretches between Damghan and the Caspian Gates via Samnan. As in times gone by we circled our greetings to

⁶ See description of this technique in Schmidt, *The Treasury of Persepolis and Other Discoveries* . . . pp. 138 f.

⁷ Completed in 1939.

RECONNAISSANCE TO THE GURGAN PLAIN

[61]

Rayy, with its memories of three past years. A few minutes later, two hours and forty-four minutes after leaving Gurgan (Astarabad), we were back on Dushan Tepe airfield, whence we had started four days before.

RESULTS OF THE GURGAN EXPLORATION

By far the most important achievement of this exploration flight to northeastern Iran is the photographic documentation of mounds, town deposits, ancient fortresses, and points of historico-geographic interest. As a matter of fact, I am inclined to consider the aerial photographs taken during our explorations as the most valuable results of our air work, for they show infinitely more than any descriptions could give.

The mapping of the great wall of Iran in its entire length of 170 kilometers, with the placing of its garrison forts, is a further achievement. The archeological map of the Gurgan plain (Map 2) supplements in the east the valuable map of T. J. Arne (see p. 58). The determination of Turang Tepe as an outstanding key site of the plain will be of interest for future excavators.

Archeologically, our landing at Mazarliq Tepe linked up the eastern part of the Gurgan plain with the western sites of Turang Tepe and Shah Tepe. It verified our assumption of a homogeneous culture in the Gurgan plain radiating from here to the plateau and in particular to Tepe Hissar near Damghan. It is possible that the invaders of Tepe Hissar and carriers of the gray pottery of the Gurgan plain formed the first recognizable wave of "Indo-Europeans"⁸ entering Iran in the 3d millennium B.C., long before they appeared in the historical records of the ancient East.

⁸ See W. M. Krogman, "The peoples of early Iran and their ethnic affiliations," in *American Journal of Physical Anthropology* XXVI (1940) 291-93.

*PLATES 57-72 * NORTHEASTERN IRAN*



SHORE OF THE "COTTON SEA" ABOVE GURGAN (FORMERLY CALLED ASTARABAD)

A solid sheet of clouds defeated our attempts to land in the Gurgan plain. (*May 10, 1937; 3:08 P.M.; altitude, 3,446 meters above Gurgan; temperature, 40° F.; 1/250 sec.; filter C [Zeiss]; direction of view, E.*)



CHAHAR DIH WITH SHAH KUH ("KING MOUNTAIN") IN THE BACKGROUND

Alexander the Great may have crossed the Elburz Range near this point when marching from Hecatompylos to Zadracarta. (May 10, 1937; 2:58 P.M.; altitude, about 1,500 meters; temperature, 40° F.; 1/600 sec.; filter A; direction of view, NE.)



THE RUINS OF SHAHR-I-BILQIS ("TOWN OF THE QUEEN OF SHEBA")

The length of the rectangular citadel mound (400 meters) serves as a scale for the good-sized town, last destroyed by the Afghans in 1731 and now largely buried below cultivated fields. (May 11, 1937; 10:14 A.M.; altitude, 1,525 meters; temperature, 55° F.; 1/250 sec.; filter B; direction of view, E.)



VERTICAL VIEW OF SHAHR-I-BILQIS

Supplementing the oblique photograph, the present view shows the plan of the citadel and of the town inclosure, both strengthened by semicircular towers. Pronounced ruin formations within the town territory indicate the sites of important buildings. (*May 11, 1937; 10:33 A.M.; altitude, 2,684 meters.*)



TOWN RUINS IN THE ENVIRONS OF THE VILLAGE OF FARUMAD

A citadel with round towers and the deposit of an extensive town are partly covered by the mosaic of cultivation near a village unnamed on our map. The plain in which this ruin is situated lies between Farumad and the highway to Sabzavar. The formation of the ruins reminds one of Shahr-i-Bilqis (Pls. 59–60). (May 12, 1937; 7:07 A.M.; altitude, about 1,100 meters; temperature, 55° F.; 1/250 sec.; no filter; direction of view, SE.)

VERTICAL VIEW OF TOWN RUINS NEAR FARUMAD

A future excavator may be grateful for this view giving the contours of buildings and rooms in addition to accurately defining the citadel inclosure and certain city walls. (May 12, 1937; 7:30 A.M.; altitude, about 2,000 meters; temperature, 40° F.)



PLATE 63



A. A TEPE INCLOSED BY THE TOWN OF JAJARM

This view well illustrates the growth of a town terrace around a central mound, which in this case will skip the stratum accumulated on the terrace, furnishing an instructive example of uneven stratification. (May 12, 1937; 8:10 A.M.; altitude, 1,380 meters; temperature, 55° F.; 1/250 sec.; filter A; direction of view, NE.)



B. VERTICAL VIEW OF TEPE AND TOWN OF JAJARM

According to C. E. Yate (*Khurasan and Sistan* [Edinburgh etc., 1900] p. 383) the mound in the center of Jajarm is 20–25 meters high and measures 110–140 meters in diameter. He also states that a moat incloses it, and the vertical view seems to indorse this statement. (May 12, 1937; 8:04 A.M.; altitude, 2,150 meters; temperature, 42° F.; no filter.)



GUNBAD-I-QABUS ("TOWER OF QABUS")

The 10th-century tomb tower stands on a rectangular mound from which a town deposit extends into the plain. (May 13, 1937; 9:30 A.M.; altitude, about 150 meters; 1/250 sec.; filter A; direction of view, SE.)

PLATE 65

A. "ALEXANDER'S BARRIER," ALSO CALLED QIZIL YILAN ("RED SNAKE")

For a distance of 170 kilometers the remains of this stupendous fortification extend across the Turkoman steppe, from the Caspian Sea to the mountains in the east. The white lines are modern tracks accompanying the faintly marked elevation of the rampart. One of many rectangular forts is visible to the left of the wall in the lower center. (May 12, 1937; 11:02 A.M.; altitude, 305 meters; 1/250 sec.; filter A; direction of view, W.)

B. A RECTANGULAR FORT AT THE SOUTH FACE OF "ALEXANDER'S BARRIER"

We counted thirty-one such forts along the south front of the wall, from end to end. Here were the garrisons of the defense system. (May 12, 1937; 11:12 A.M.; altitude, 550 meters; temperature, 58° F.; direction of view, N.)



A

B





RUINS OF A CITY ON THE SOUTH BANK OF THE GURGAN RIVER

The south bank is lined with such town ruins. (*May 12, 1937; 11:14 A.M.; altitude, 700 meters; 1/250 sec.; filter A; direction of view, S.*)

VERTICAL VIEW OF A TOWN RUIN ON THE SOUTH BANK OF THE GURGAN RIVER

This map view shows the entire plan of the city quarter photographed. A citadel formation is visible on the north bank (lower right corner). (May 12, 1937; 5:26 P.M.; altitude, 1,950 meters; 1/250 sec.; filter A.)





TOWN RUINS WITH RECTANGULAR INCLOSURE

We noticed several towns of this type in the Gurgan plain. In the center of the town here illustrated a pronounced square—a citadel formation—is inclosed by a moat. The most prominent buildings of the settlement are grouped near by. The garrison quarters were presumably in the large square fortress at the far left corner of the town wall, which apparently inclosed some fields as well as the buildings of the town. A small mound is visible in the upper center, not far from a modern village with some walled-in gardens or fields. (*May 12, 1937; 5:20 P.M.; altitude, 1,860 meters; 1/250 sec.; filter A; direction of view, S.*)

A TEPE FORMATION IN THE GURGAN PLAIN

The fortress mound fades into the town deposit, which presumably spreads for some distance into the plain and below the houses of the Turkoman village in the foreground. The "honeycombs" in the village area are wells, those on the mound probably holes made by pot-hunters. The small circles were once described to us as Turkoman graves; but one at least, between the village and the mound, is a corral. A rectangular citadel formation is in the far left corner. (May 12, 1937; 4:40 P.M.; altitude, 250 meters; 1/250 sec.; filter A; direction of view, SW.)





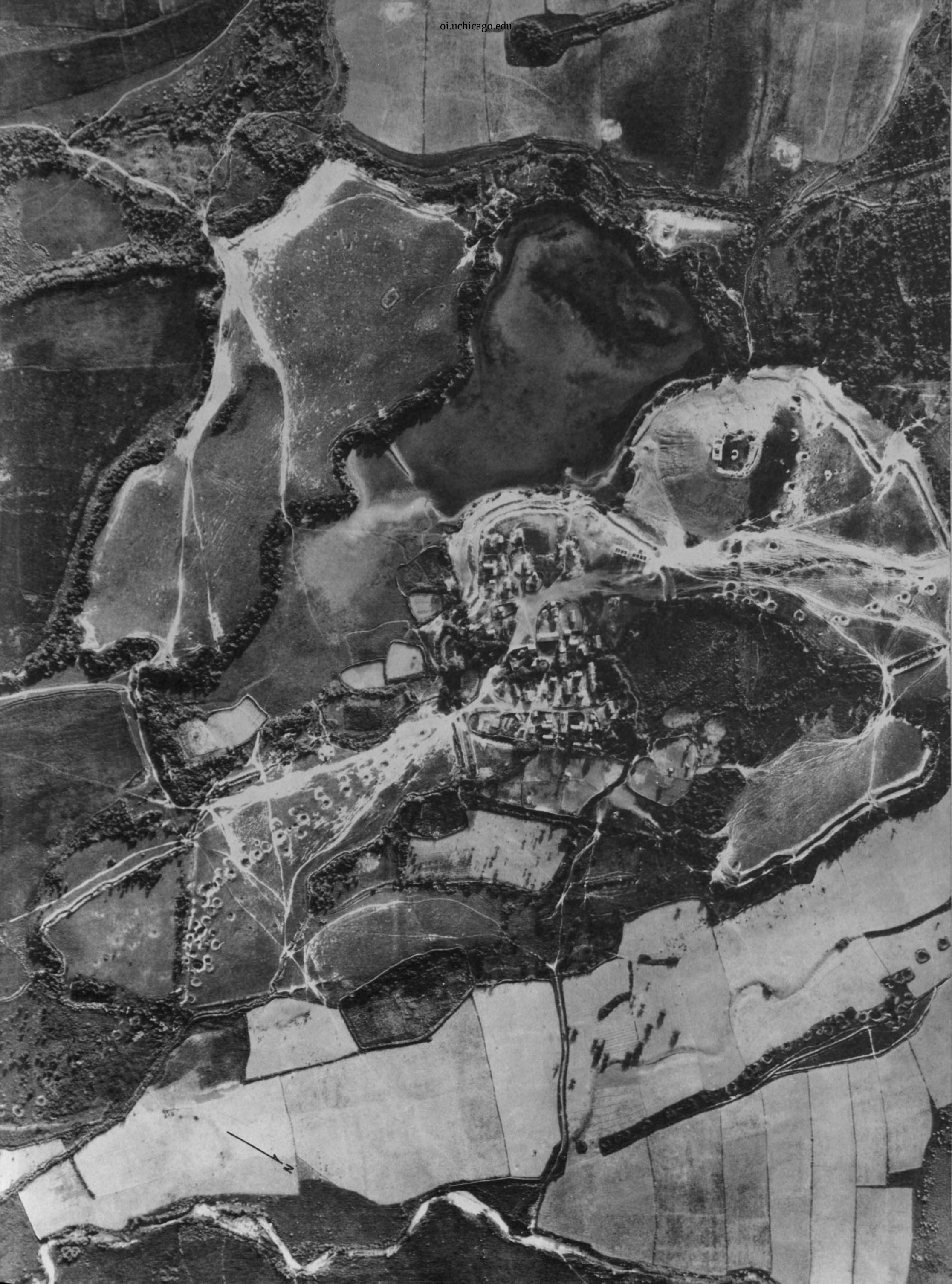
TURANG TEPE ("PHEASANT MOUND")

This fine site was tested by Frederick R. Wulsin in 1931. Its truncated conoid, partly pyramidal main mound rises about 30 meters above the plain, and lower town deposits extend from the fortress hill in all directions. A lake covers part of the site except during the dry season. (*May 13, 1937; 10 A.M.; altitude, 120 meters; 1/250 sec.; filter B; direction of view, SE.*)

PLATE 71

VERTICAL VIEW OF TURANG TEPE

With certain base points marked this photograph would have saved Wulsin a topographic ground survey. Although the weather was far from ideal, the ruin deposits and the details of the environs are clearly marked. (*May 12, 1937; 5:11 P.M.; altitude, 1,740 meters; 1/250 sec.; no filter.*)





A. MAZARLIQ TEPE AT THE EASTERN END OF THE GURGAN PLAIN

Here we landed, and the surface potsherds told us of the homogeneousness of the ancient cultures in the Gurgan plain and of their uniform connection with the invaders of Tepe Hissar on the plateau south of the Elburz Mountains. (*May 13, 1937; 8:58 A.M.; altitude, 185 meters; temperature, 60° F.; 1/250 sec.; filter A; direction of view, E.*)

B. THE ELBURZ MOUNTAINS, BARRIER BETWEEN THE LOWLANDS OF THE GURGAN PLAIN AND THE INNER IRANIAN PLATEAU

From the Gurgan plain, which is partly below the level of the Black Sea, we spiraled up through sheets of clouds to cross the formidable ranges between Gurgan and Tehran. The snow-capped Shah Kuh ("King Mountain") looms on the horizon. (*May 13, 1937; 11:35 A.M.; altitude, 1,900 meters; temperature, 55° F.; 1/250 sec.; filter B; direction of view, SE.*)



MOUNDS OF WESTERN AZERBAIJAN; TAKHT-I-SULAIMAN; ECBATANA

TEHRAN-TABRIZ, PAST THE VALLEY OF ALAMUT

A SHORT report on the results of the flight to the Gurgan plain was submitted to His Imperial Majesty, together with a request to expand the air explorations to the country west of the Caspian Sea. His Majesty graciously consented and thus showed us his trust by letting us explore an area which is somewhat delicate from political viewpoints.

News that the permission had been given reached me in Tehran, where I was completing the scientific records of the Rayy Expedition. At once we dashed back to Persepolis to organize matters. Maps and instruments were put in order by the air crew, while Fred Lillich, the "ground crew," assembled tools and reserve parts for emergencies. He was to drive to Tabriz, together with Balassanian, the Azerbaijani-Turkish-speaking camp superintendent of Rayy. The log shows some hectic flying: July 16, Persepolis-Tehran; July 18, Tehran-Persepolis; July 20, Persepolis-Tehran; and on July 21 we were off for Tabriz to fill another gap on the archeological map of Iran.

July 21, 1937. Tehran, Dushan Tepe airfield; altitude 4,400 feet; 5:25 A.M., sunrise; temperature, 74° F.; clear sky; Elburz Mountains rise purple in twilight before sunrise; the cone of Mount Damavand gray on orange, struck by the sun long before the rest of the sky line; its shadow shoots obliquely up to the sky. Four minutes later we took off, following the highway to Qazvin, the earth in magnificent relief below. Innumerable *qanāt*'s, subterranean water conduits with intermittent openings, pierce the gently sloping talus of the Elburz Mountains. A large irregular circular *tepe* (mound) crops out of the plain at Miyanjub. Others are noticed beyond Karaj, near Muhammadabad and 'Abbasabad. A large irregular conoid site is at Yangi Imam. Here we turned off the trodden path northward toward the valley of Alamut in order to get acquainted with the topography of the center of the Assassins, whose head, the Old Man of the Mountain, had his abode here (see p. 36).¹

After crossing the first Elburz range we struck the valley of the Talaqan River. The log mentions its winding course, patches of villages, trees, mosaics of cultivation, and high steep slopes at either side. Soon the valley turns into a canyon, and at the junction with the Alamut River the

¹ Cf. Freya Stark, *The Valleys of the Assassins and Other Persian Travels* (London and New York, 1934).

country below looked really as rough as roughest Luristan. The air too was quite restless. Hence the pilot preferred not to get down into the canyons and close to the jagged slopes. We could not see the remains of the Assassins' strongholds, but we obtained a good idea of the topography of this wild valley, locked away from the outside world by high ranges, self-sustained by cultivation of the central valley and by terracing of every patch of soil wherever it clings to the slopes. Plate 73, though hazy, shows the southern slopes of Alamut with its terraced fields.

Now we headed straight across the mountains toward the Mongol city of Sultaniyyah, which M. Godard, the director of the Service of Antiquities, had asked us to photograph. Sheets of haze were again floating above the modern town and above the contours of the former *ülkhān* capital with the tomb of Uljaitu (1304-17). Still, better a bad air photo than none. Obliques and verticals were taken, showing, as at the Seljuk town of Savah (Pl. 30), the "honeycombs" of native pot-hunters.

While roughly following the highway, we saw nothing of particular interest along our route (1 on Map 3) to Tabriz. An impression is left of fertile plains, such as the Sultaniyyah area, the cultivation narrowing in parts to the width of the river channels washed out in former times. At 11:02 A.M. we landed on the airfield of Tabriz (altitude, 5,000 feet). In so doing we blew out the tire of the tail wheel. But in the evening the "ground crew" arrived by car and patched the wheel.

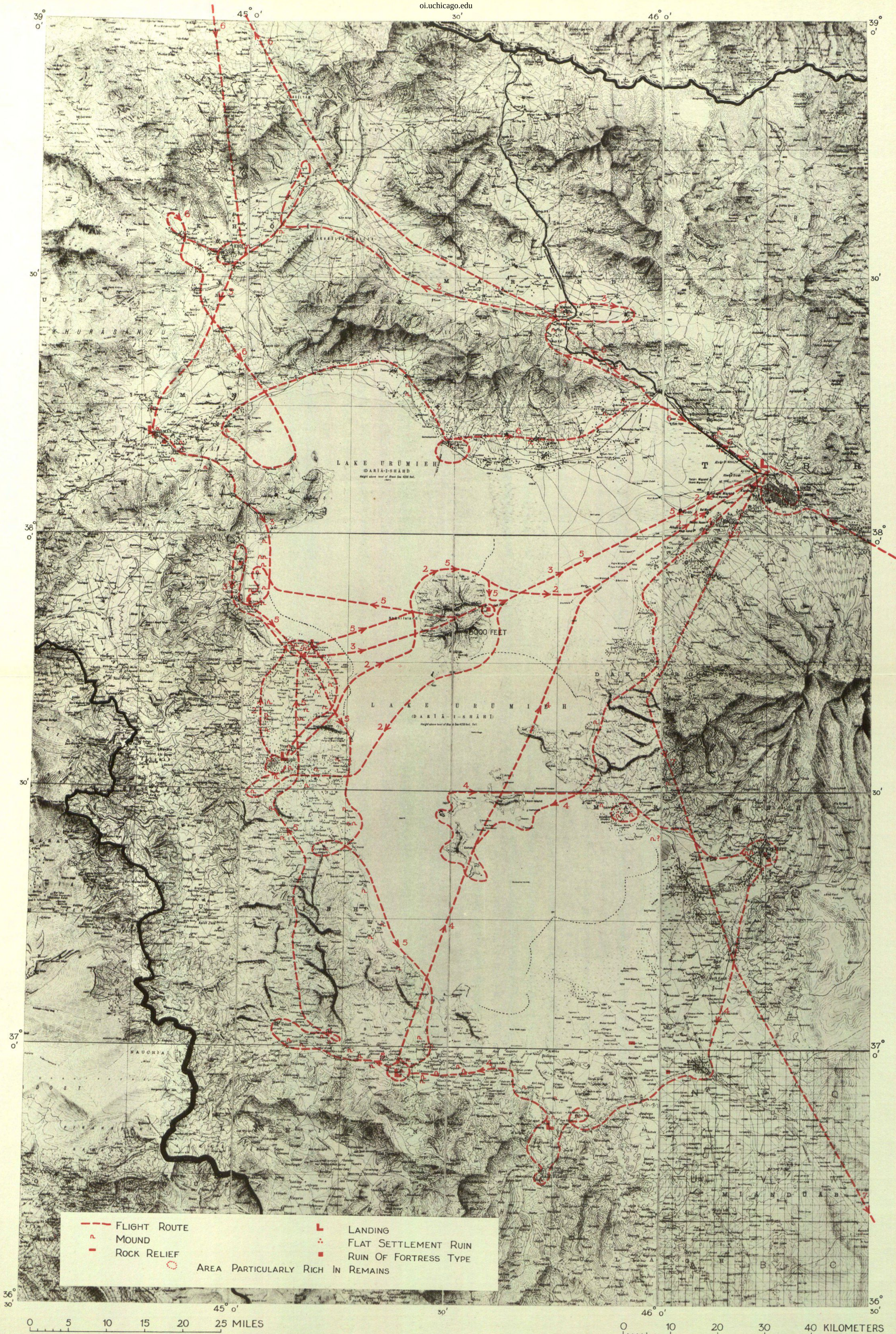
ACROSS THE LAKE TO RIZAIYYAH (URMIYAH) TOWN (ROUTE 2 ON MAP 3)

The first "flat" made us cautious. From now on Fred Lillich became a member of the air crew so as to be on hand in case of trouble. We did not get off until late in the morning, for Fred was busy with the ship. We headed straight for Lake Riza'iyyah (Urmiyah), soon leaving behind the fertile plain of Tabriz, while below us the country turned more and more to desert spreading northwestward. This alluvial desert with its *moiré* of mud and salt faded into what should have been the lake marked on the map. But this part of it had disappeared, making the island of Shahi a peninsula (see Pl. 79). Still there is hardly a doubt that melting snow each spring turns Shahi into an island. We skimmed its southern shore, floating 5,500 feet above it and passing the field mosaics of the island villages of Saray and Gamiji at some distance. We had then no idea that Saray lay close to our most interesting discovery. Then for 28 kilometers we crossed beautiful dark turquoise water.

The western shore was struck at the mouth of the Barde Sur River, and almost at once the hunt for *tepe*'s began. The log: Large, irregular circular mound north of Kurdlar; large crescent-shaped mound near Gulpashan; Guk Tepe, 6 km. SE. of Riza'iyyah town, large, mostly covered

*WESTERN AZERBAIJAN, BASED ON SURVEY OF INDIA MAPS WITH THE PER-
MISSION OF THE SURVEYOR-GENERAL OF INDIA AND OF THE CON-
TROLLER OF HIS MAJESTY'S STATIONERY OFFICE*

This map furnishes the overland explorer with a basis for his operations in the vicinity of Lake Riza'iyyah, formerly called Urmiyah, and plots work for generations of excavators.



by village and modern cemetery, with Armenian church on top; large, pockmarked, irregular oval mound (Tepe Digalah, where subsequently sherds were gathered) 2 km. east of Riza'iyyah; irregular circular mound with fortress contours 2 km. south of Riza'iyyah; and so the log goes on, describing the sites after they were marked on the map.

From Riza'iyyah we flew northward as far as Kirjalar and Angiyan and followed the shore, somewhat inland, back to Riza'iyyah. We knew then that we had found another center of ancient cultures. The plain of Riza'iyyah is studded with ancient towns which millennia of wind and weather have turned into smooth hills of mud filled with the remains of their utensils, weapons, and objects of art through the ages and with the burials of their former occupants. The natives call these mounds "ash hills," presumably on account of the darker color of certain hills. But they do not seem to be any different from the *tell*'s, *hüyük*'s, or *tepe*'s, that is, ruin mounds, of other areas. The use of much wood in certain ancient settlements may give more ashes and hence a darker color to some hills.

We landed on the "airdrome" of Riza'iyyah (altitude, 5,000 feet), which made us think of "landing on a dime." Our captain managed it; but the tail wheel went flat again. Fred Lillich, who had been pointing his ears for some time, found also that a coil was burned out. It was fortunate that he had been made a member of the air crew. He spent most of the afternoon stuffing the tail tire with scraps of cut-up inner tubes, making a very respectable solid tire out of it. Coil trouble had been foreseen; the spare was in the cockpit.

The sun was getting low when all was shipshape. At 5:25 we took off, heading back across the lake; but this time we skimmed the northern shore of the island of Shahi. We saw nothing of archeological interest. The village oases of Burchalu and Qipchaq were green patches in the drab wilderness of the Shahi mountains. The shore line was again corrected; but once more we missed the only important point on the island, the rock near Saray. At 6:18 we "checked in" above the Tabriz airfield, but decided there was enough gasoline to have a good look at the town and its famous Blue Mosque, built in the 15th century. It was recorded by several verticals (e.g. Pl. 74 A). In addition, an interesting oblique (Pl. 74 B) of the northern edge of the city documents certain citadel formations and, without our then knowing it, the mountain sanctuary of 'Ainali-Zainali on top of the Yilan Dagħ ("Snake Mountain").

TOWNS NORTH OF THE LAKE; "HULAGU KHAN'S TREASURE HOUSE"
(ROUTE 3 ON MAP 3)

The program for July 27 was the northern half of the lake area. There were very few mounds between Tabriz and Marand along the highway and the Tabriz-Tiflis railroad. Stranger yet, the very fertile plain of Marand and Bunab seems to be almost void of traces of ancient towns. We

noticed only three *tepe*'s, all of them in the environs of Marand. One of them, near Kulli, 4 kilometers south of Marand, is horseshoe-shaped. An oval mound incasing the ancient capital of the plain lies directly at the southern outskirts of Marand (Pl. 75). A smaller mound is at the western edge of the town, which in the 14th century was famous for the rearing of the "red worm" (cochineal).²

Now we turned westward into the valley of the Zilbir Chay. Soon, after Arsi, the mosaics of cultivation gave way to streaks of salt and a desert *moiré* of feeble green and tan. There was not a single mound between Marand and the plain of Khu'i. Here, however, a loop to the side valley of Biznadah located several *tepe*'s, as shown on Map 3. Khu'i is a striking little town. It reminds one of the exquisite European towns that time seems to have forgotten behind their medieval ramparts. But its present city wall, of Vauban type, is not that of which the Muslim geographers Yaqut and Qazwini speak when mentioning the strongly fortified 13th-century town of "Khawi."³ Yet in general appearance probably not much has changed, and with a little self-deception (and overlooking the broad modern streets) we may imagine we are looking down on a Mongol town of seven hundred years ago (Pl. 76). A curious concept of racial color shades is shown by a 14th-century geographer: Mustaufi states that the people of Khawi are white-skinned like the Chinese!⁴

Our next aim was the Dilman-Salmas area. Contrary to A. V. Williams Jackson's information⁵ we saw quite a number of "ash hills" in the wide plain, mostly in the environs of Dilman (now called Shahpur), the modern successor of Salmas (Kuhnah Shahr-i-Salmas). There is a town as large as modern Dilman, but totally ruined and deserted, one kilometer southeast of the former. In close proximity to Dilman, northwest of town, we saw two mounds and decided to land in order to get samples of potsherds from this area northwest of the lake. Benn found a nice flat spot one kilometer from the outskirts of the town. The log states: 8:47 A.M. Altitude, 5,100 feet (1 km. to the north the Survey of India map gives 4,683 feet); temperature, 74° F. Natives told us that the name of each hill was Kul Tepe ("Ash Mound"). We called the nearer one Kul Tepe I, the other Kul Tepe II.

After bagging our game—rather characterless sherds in brown shades, two obsidian flakes from "Kul Tepe I," and sherds resembling "Alishar II" ware from "Kul Tepe II"—we were off, following the highway across the Qara Bagh Peninsula. No mounds were observed from 'Ali'abad as far as Guchi, on the southern shore of the mountainous spur of land. We missed the Sasanian relief mentioned and illustrated by Jackson.⁶ At Guchi the hill hunt started again. Ancient

² Le Strange, *The Lands of the Eastern Caliphate*, p. 167.

³ *Ibid.* p. 166.

⁴ *Ibid.*

⁵ *Persia Past and Present*, p. 91.

⁶ *Ibid.* pp. 79–81.

settlements lined the shore, somewhat inland and dodging the littoral strip of marshy land visible on Plate 77. A sample mound of this area is a circular site (Pl. 78) situated roughly at the spot called "Akbulagtapasi" (Aq Bulaq Tepesi) on the map. A boulder ruin on its summit is nicely marked on the vertical view, while temporary modern settlements with their mud huts and corrals appear better on the oblique. We combed the small plain as far as Galungi; but off the coast strip we saw only the remains of a stone-built structure of problematical age on top of a rocky crest about 2 kilometers north of Galungi. On arriving at the north end of the Riza'iyyah (Urmiyah) plain, over the Angiyan area which we had touched before, the captain decided it was time to make a beeline for Tabriz. Luckily this route took us straight across the island of Shahi; and then, at last, we discovered "Dadan Rock." It may have another name; but, at any rate, it is the easternmost promontory of Dadan Mountain, at the shore of the island.

Benn looked a little supercilious when I first told him that there was something on that rock some distance off. But he nosed the "Friend of Iran" closer, and then we saw clearly the man-made changes on the face of the inclined summit of the precipitous rock. It was close to noon, and earth and rock had lost their relief. We flew on to Tabriz, for to photograph it then was useless. But we returned three times to this fascinating spot, which only a bird or a flyer can notice. As we shall see, however, there is an indication of the importance of this point at the rock base as well.

It is best to combine at once the information gathered during all our visits (see Pls. 79-82). The bat shape of the plan of Dadan Rock is indicated on the vertical view (Pl. 82). Rising about 1,000 feet (about 300 meters) above the lake shore and above the fertile valley of Saray (seen behind the rock on Pl. 80), it forms part of the bizarre and picturesque formations along the eastern edge of the island-peninsula of Shahi (Pl. 79). Not far from the apex of its inclined summit a row of three chambers cut out of the living rock and, parallel and below them, two more rock chambers, long and rectangular, form the focal installation of this almost inaccessible site. With the aid of a magnifying glass we can count on the photographs (particularly Pls. 80-81) more than a dozen water basins, also hewn out of the rock surface, arranged in such a manner as to gather the drainage of the summit slope. The telltale vertical view shows also certain features which we ourselves did not notice when circling over this fascinating spot, because our eyes were glued to the summit. The map view (Pl. 82) records, at the base of Dadan Rock on the east-northeast, the ruined contours of an angular fortification with two circular towers, certainly protecting the only possible ascent to the mountain top.

An overland expedition will have to gather further details. Fragments of pottery would define the period of occupation, and there is always a chance of finding written or pictorial records cut into the rock. For the time being we have only one clue for the identification of our discovery: According to Muslim geographers of the 14th and 15th centuries there was "a great castle crown-

ing a hill" on the island of "Shaha" (i.e., Shahi)—the tomb of Hulagu, the Mongol ruler who died in 1265, "and other of the Mongol princes." Already in the 9th century the castles of Shaha and Yakdur are known to have been held by rebel chiefs. Hulagu rebuilt the Shaha castle "and stored here all his treasures, the plunder of Baghdad and the provinces of the Caliphate." The castle subsequently became his tomb. But the "treasury" was presumably soon evacuated or rifled; for in the beginning of the 15th century the castle was entirely deserted.⁷

We cannot imagine a spot better suited for a treasury than Dadan Rock. The castle may have stood over the three rock-cut chambers; and the latter, particularly their narrow annexes, may have been the very tombs of "Hulâgû and other of the Mongol princes." The surface formation in the environs of the three chambers and of the parallel rectangular cuts below suggests structural debris, and furthermore contours of ruined buildings are faintly marked at other spots.

The reference to the 9th-century rebel chieftains indicates that Dadan Rock was occupied in pre-Mongol times, if it should be proven that it is the same site. At any rate, the interpretation of our aerial discovery stops at this point. It is clear, however, that extremely interesting information can be gathered by an exploration party following these clues.

THE SOUTHERN LITTORAL GIRDLE; MOUNDS IN THE GADIR VALLEY
(ROUTE 4 ON MAP 3)

For the third exploration day we planned to close the flight circle around the lake. But, as we shall see, the program was too big to be finished in one excursion. Roughly following the main highway and passing the densely cultivated oases of Sardarud, Mamagan, and Dakhargan we were astonished to see not more than a single mound between Tabriz and the 'Ajabshahr-Khanyan plain. This one hill, medium-sized and circular, lies beside the highway about 3 kilometers northeast of Khanagya. Northwest of 'Ajabshahr we turned offshore to have a look at the archipelago grouped about Quyun Island. Our only discovery was a group of three more little islands, not marked on the map. They are directly west of Ispir Island. May they stay nameless as before. The archipelago seems to be totally void of occupation, ancient or modern. Trees are loosely scattered over most of the islands. Sand-and-salt beaches line the bays, surmounted by dark volcanic (?) rock.

Near the pier of Qilich Dagh we struck the shore again and mapped four mounds and a town ruin in the 'Ajabshahr plain while proceeding in gentle serpentine to Maraghah, some distance south of the impressive Kuh-i-Sahand ("Sahand Mountain"). Maraghah was the capital of Hulagu the Mongol, whose treasury and tomb we may have rediscovered (cf. above). The most

⁷ See Le Strange, *op. cit.* p. 161.

famous point in this vicinity is the remains of Hulagu's observatory. Two hills suggesting ruin mounds are west of town.

Once more, while flying southward past Malik Kandi and Miyandu'ab to Sa'uj Bulaq,⁸ we crossed an archeological hiatus. We may have missed some sites which may be situated nearer the present shore. Dr. J. Siems, long a Tabriz resident, told me of a site called Tash Tepe ("Stone Hill"). About 15 kilometers northwest of Miyandu'ab is a village named from this mound. At that spot was placed an inscription⁹ commemorating the victories of the Vannic king Menuas.¹⁰ Hasan Hajji, a village west of Miyandu'ab, may rest on a mound base.

In the valley of Sa'uj Bulaq sight-seeing turned again into exploring. In spite of clouds Guk Tepe (Pl. 83), roughly 13 kilometers northeast of Sa'uj Bulaq, was photographed as a good example of the growth of a mound. The fortified building on top of the main mound in center illustrates the successive fortresses that had preceded it on this spot. Thus it grew faster than the rest of the town, especially when the latter consisted of such scattered buildings as at present. The structural contours of the top stratum are well marked on the circular platform, and it will not be long before the village of Guk Tepe will form another, though intermittent, layer of the old mound.

Sa'uj Bulaq was circled; then we landed north of town near Driyas and near a mound which the villagers told us was called Ghuli Tepe. A village named "Gird-i-Koli" is near by on the map. It did not take long to gather the precious potsherds—"precious" because they may cost an airplane each time we land on unknown ground. But the sherds were interesting. There were fragments that showed close resemblance to the gray ceramics of Hissar II-III type found also in the Gurgan plain on the opposite shore of the Caspian. The mound was smaller than it appeared from above, since its base is natural soil or rock. We were not far from a spot marked "cave" on the Survey of India map. It is on the opposite, eastern bank of the Sa'uj Bulaq Chay, and it should be the tomb described by J. de Morgan, *Mission scientifique en Perse* IV 1 (Paris, 1896) pp. 293-98.

Half an hour after taking off from Ghuli Tepe we touched the earth again. We had to take another close look, this time at one of the numerous town mounds scattered about in the plain of the Gadir River. Hopping ditches, Captain Benn made a clever landing near one of the most attractive mounds of this area, Tepe Naqadah (Nakhuda on map), mostly encircled by its prospective next stratum, a little town of the same name (Pl. 85). I walked all over the extensive site

⁸ The Ministry of Education has recently changed certain names—Sa'uj Bulaq to Mahabad, Sa'in Qal'ah to Shahin Dazh, Aji Chay to Talkhah Rud, Jaghatu Chay to Zarinah Rud—and has extended the name of the Safid Rud to its tributary formerly called the Qizil Uzun. The names used in this volume are those now supplanted, but both the old and the new names appear in the Index and on the map of Iran on the front end papers.

⁹ Mentioned by A. V. W. Jackson, *op. cit.* p. 119.

¹⁰ *Cambridge Ancient History* III (1929) 174.

gathering chronology in baked clay. Sherds resembling gray ware of the Gurgan plain and others of Anatolian affinity were the most interesting. In the village we bought a small ceramic bovine very similar to an effigy vessel found in a child's grave at Tepe Hissar (IIIC) near Damghan.

Once again our captain had to tell me that we had better fly home as the crow flies. Zig-zagging from mound to mound empties the gas tanks rather rapidly, as compared with beeline flying. The take-off was quite as close as the landing; but Benn managed it. Before striking the shore we plotted a fine city mound directly west of Khasani. The extensive circular deposit rises gently to the pronounced central elevation. Passing a pier (not marked on the map) near Talau we floated again above the beautiful lake, now gray-green, with little whitecaps, and dotted with shadows of clouds. The archipelago examined a few hours earlier emerged from the haze, and I noticed another spot that needed correction: "Eshek" ("Donkey") Island had its "muzzle" at the wrong angle. We crossed a spur of the mainland near Zinatli, then the salt marshes at the mouth of the Aji Chay, and followed to Tabriz the course of the latter, green village oases to the right and desolate desert to the left.

FILLING THE GAP IN THE SOUTHWEST (ROUTE 5 ON MAP 3)

A few minutes after sunrise on July 25 we took off into the haze west of Tabriz. By now we were quite familiar with the strip from Tabriz to Shahi and with the changing ground colors underneath; but rain the night before had made them particularly vivid. Dadan Rock with "Hulagu Khan's treasury" was once more recorded by not less than nine obliques and verticals. Then we dashed across Shahi Island in four minutes and nosed straight for the mound near Aq Bulaq Tepesi (cf. p. 67), across rippling Lake Riza'iyyah. An interesting octagonal ruin (Pl. 84) was recorded northwest of Jabal Kand. Then we started southward to skirt the entire western shore. Near Talau, on the southern shore, we joined our new flight track to that of the preceding day. The Khasani mound, mentioned above, was photographed, and Naqadah too (Pl. 85) was retaken. If the light had been better the vertical view of the Naqadah hill would be still more tell-tale than it is. I mentioned previously that I walked all over this mound gathering potsherds; but in spite of many years of experience I did not notice the fortification so plainly marked on the extraordinary "X-ray" view. It is hard to say whether the polygonal fortress with eight round towers belongs to the last stratum of the site or whether the houses of subsequent occupants filled the interior until the rising debris was flush with the top of the foundations of an earlier fortress—a frequently observed occurrence.

When combing the western part of the Gadir valley we found that except for Naqadah the largest mound, a circular, slightly oval town site, was situated near Kamis, about 9 kilometers northwest of Naqadah. But there were quite a number of sites attractive to an excavator's eye be-

fore we reached the little town of Ushnu, the westernmost point we dared to touch. The borders of Iraq and Turkey are not far from here.

We considered our work in the plain of Gadir or Sulduz completed and turned straight north again, but inland, following in part the course of the Kinispi River. It was rough, red-brown mountain country, but attractive because of the little valleys all covered with green. It reminded me of landscapes in the Kurdish mountains northwest of Kirmanshah.

There was not a single mound for 38 kilometers north of Ushnu. Then, at Zurgabad and Baranduz, the outposts of the Riza'iyyah (Urmiyah) mound area appeared. While crossing the Riza'iyyah plain we marked several more mounds on the map. This shows that we had certainly missed quite a number of sites on our previous flights. But complete mapping can only be accomplished by strip-plotting.

A *tepe* near Angiyan, at the northernmost end of the plain, had several times attracted our attention. We landed near the roughly circular town site (Pl. 86) and found that it is called Tepe Anginah. Plain red sherds prevailed. Gray ware was scarce, but wavy patterns in gray and in brown were found on fragments with reddish brown surface.

Our work for the day was done. Heading for the northwest tip of Shahi Island we retraced parts of our former sky routes past the pink salt beaches of Burchalu and Timarlu and past Dadan Rock to the mainland marshes of the Aji Chay and on to Tabriz.

MOUNT ARARAT AND THE CLIFF TOWN OF MAKU (ROUTE 6 ON MAP 3)

We made no discoveries on our excursion to the northwestern tip of Iran; but it was a perfectly beautiful flight. We took a rather straight course toward Maku, making gentle undulations to dodge the higher ranges. West of Marand, when floating about 5,000 feet above the Zilbir Chay valley, we first saw the eternal snowcap of Mount Ararat, 100 miles away. On the entire flight from Tabriz to Maku the only mounds we noticed were those previously mapped in the environs of Marand and in the valley of the Qutur Chay, northeast of Khu'i. The rough mountain country between the Khu'i valley and Maku appears to be void of pronounced traces of ancient occupation.

One hour and eleven minutes after taking off we arrived above the Maku canyon formed by the Zangimar Chay. At its western mouth, above Sangar, a magnificent mountain scene spread before us. The cones of the biblical mountains, Ararat and its lesser companion, rose majestically from the marshy plain north of us. It was an awe-inspiring sight. Of course I grabbed the camera to record this unique landscape; but our governmental companion, Lieutenant Rahmani, touched my arm and asked me not to take the picture. I had to admit he was right, for, after all, the border between Iran and Turkey was only a few miles beyond, and border country is always a

delicate strip of land. We esteemed Rahmani very highly, as an intelligent officer and as a good comrade. We wished we could have followed his suggestion to land and say a few explanatory words to the border garrison. But there was no spot safe for landing. However, we followed his advice to fly lower so there might be no doubt that we stayed within Iranian territory. Benn dived the ship into the picturesque but rather narrow canyon, and there at last we saw the strange cliff town of Maku, reminding one of the prehistoric cliff pueblos of the American Southwest. Even had it not been in purple shadow, it would have been very difficult for the captain to turn the plane in order to get the town on my side for photographing.

Veering to slightly east of south we flew to Khu'i once more and rephotographed this interesting little town. Then it was decided to close the flight circle around the lake by filling the gap along the north shore. A loop in the northwestern bay disclosed only one mound, a small oval hill near Qara Qishlaq. From this point as far as Dizah, along the entire northern crescent of alluvial plain, we did not see any traces of ancient occupation, though the southern slopes of the Mishu Dagh were covered with many attractive modern villages and large terraced patches of cultivation, increasing in extent toward the east. From Dizah to Sufiyan Map 3 shows quite a few mounds, though only at Sharif Khanah did the ancient settlers of this strip of country occupy a spot close to the shore, as indicated in the cultivated oasis of this town by a honeycombed mound about one kilometer west of the pier. We arrived early in Tabriz after this final exploratory flight in the Riza'iyyah country. The circle was closed. In five days we had completed our archeological air survey of western Azerbaijan.

TAKHT-I-SULAIMAN

On July 27 we took off into a clear sky overhead; but cloud banks threatened in the southeast, in the west, and in the north. These climatic features of the Riza'iyyah-Tabriz area are interesting, since the inner plateau hardly ever knows clouds and rain in summer. We were bound for Tehran; but there were two tempting foci of archeological importance requesting detours: Takht-i-Sulaiman and Ecbatana.

Once more we passed near Maraghah and Miyandu'ab (Route 7 on Map 3); then new land started. The valley of the Jaghatu Chay was our guide. The little town of Sa'in Qal'ah is built around the only fair-sized mound (a truncated cone) noticed by us along the course of this river. Myron B. Smith, who soon afterward passed through Sa'in Qal'ah, found painted and black polished prehistoric sherds on this hill, in addition to historical plain ware.

Our guide vanished as we passed its sources. From Sanjud we roughly followed the track down below where unfortunate motorists would have to travel. At Gug Aghach we took the

northeastern branch of the trail; but the map turned rather vague, and only after some combing and circling did we find our aim, the "Throne of Solomon" (Pls. 87-89).

A. V. Williams Jackson¹¹ has accumulated historical references to this magnificent site, correcting also views of the earlier explorers, in particular Sir Henry Rawlinson's identification of Takht-i-Sulaiman with Median Ecbatana. Shortly after our aerial visit Myron B. Smith and Arthur U. Pope independently visited and surveyed the ruins on this outstanding spot. Both men, in addition to M. Godard, were supplied with aerial photographs to support their studies.¹²

For almost an hour we circled above the extraordinary oval fortress, built on a natural knoll which may have been formed, as Jackson implies, by the calcium precipitated from the lake situated off center in the inclosed area. Whenever the sun, peeping between the cloud shadows, illuminated the site, it was photographed (cf. Pls. 87-89). Not less than twenty-two verticals and obliques were taken.

The site of Takht-i-Sulaiman was occupied from Parthian until Mongol times, though its period of greatest splendor was presumably the Sasanian empire. Takht-i-Sulaiman has been identified with Parthian Praaspa, Byzantine Ganzaca, and Arab Shiz. It is of course possible that this prominent spot was settled in pre-Parthian periods; some future excavation will determine that. The fire temple shown on the air views may have been the shrine of Adhargushnasp, the royal fire, as pointed out by Jackson¹³ and indorsed by Arthur E. Christensen.¹⁴ Legendary history narrates that the Sasanian monarch would make a humble pilgrimage on foot to this sacred spot when ascending the throne of the empire. In the debris of the buildings of Takht-i-Sulaiman the excavator may find remains of "marvelous colored pictures [murals?] representing the celestial bodies, the stars, the earth with its continents and its oceans, its inhabited parts, its plants, its animals, and other astonishing things."¹⁵

The air views show the rectangular grouping of buildings around the lake as center and indicate the obviously focal position of the fire temple. Two gates are well marked, while two more openings, mentioned by Jackson, cannot be made out. They may be two of several gaps in the wall. The inclosure with its towers stands out in fine relief, while the palatial area in the southern half is well distinguished from the northern town debris with its roughened formation of dense occupational deposit.

¹¹ *Persia Past and Present*, pp. 124 ff.

¹² Preliminary studies by Arthur U. Pope and his party on Takht-i-Sulaiman appeared in 1937 in *Bulletin of the American Institute for Iranian Art and Archaeology* V 71-109. See also Donald N. Wilber, "The Parthian structures at Takht-i-Sulayman," *Antiquity* XII (1938) 389-410.

¹³ *Op. cit.* pp. 131-42.

¹⁴ *L'Iran sous les Sassanides* (Copenhagen, 1936) p. 161.

¹⁵ Christensen, *loc. cit.*, citing Mas'udi.

An extraordinary rock formation (Pl. 90) is about 2.5 kilometers southwest of Takht-i-Sulaiman. It is a hollow cone appearing blackened on the inside. I believe with Jackson that this Mount Zindan, as he calls it, is a volcanic formation. If it had been in action it would well explain the presence of an outstanding Zoroastrian sanctuary in its proximity. According to Jackson the crater, exhaling sulphurous fumes, is about 300 feet in circumference, while its visible depth is several hundred feet. A further chasm may extend below. The oblique view (A) shows faintly the circumvallation of Takht-i-Sulaiman in the distance. However, a ruin formation of two concentric circles, which we noticed roughly west of Takht-i-Sulaiman, is not defined on this view.

Vaguely mapped "rough-bottom country" without any traces of ancient sites extends between Takht-i-Sulaiman and Bijar, which we left about 15 kilometers to the right of our flight line to Hamadan. Our archeological log of this leg of our exploration flights remained blank until we entered the plain of Hamadan, and even there we noticed far fewer deposits than in the plain of Kirmanshah. Again the sky was overcast and the air hazy. Owing to the absence of ground relief we may have missed the less pronounced sites. About two hours after leaving Takht-i-Sulaiman we arrived above Hamadan, the site of ancient Ecbatana, and landed on the good airfield north of town; the altimeter read 6,200 feet.

ECBATANA

For two years we had hoped to examine the town of Hamadan from a bird's-eye perspective and to let the aerial film give us additional possibilities of analyzing our observations. Now that we had finally arrived, the weather was against us. Only a few spots of sunlight were wandering sporadically across the town when we took off in the afternoon to identify the exact site of the ancient capital of the Medes and, after their fall, of the Achaemenians. Once before, when crossing the town on an obligatory beeline, we had noticed a raised oval below the clustered cubicles of modern houses. We were correct in suspecting this quarter of the town. This oval elevation is the mound of Ecbatana. The oblique and particularly the vertical air view (Pls. 91-92) outline the city mound beyond doubt. Furthermore, in the quarter covering this area several finds have been made which indicate the presence of palatial structures below present ground level.

Not on the bare hill al-Musalla, as Jackson believed,¹⁶ stood the castle of Deioces with its seven walls, their battlements in seven colors—white, black, red, blue, orange, silver, with gold as the innermost. Even in case much wood had been used in the construction of the fortress walls and of the palace and treasury they inclosed, enough debris would be left to show a definite deposit. There is simply none on al-Musalla, except the contours of a presumably Islamic *qal'ah* (fort).

¹⁶ *Persia Past and Present*, pp. 146 ff., where historical references to the famous capital will also be found.

I must admit, however, that the core of the mound of Ecbatana may be a natural elevation similar to al-Musalla, which resembles in its oval form the shape of the city mound. Our aerial views will guide the future excavator of Ecbatana.

Our exploration was now completed. Next morning, July 28, our sky track paralleled the highway to Qazvin. Qazvin's sanctuaries were photographically recorded; but there was no chance to repeat our visit to the valley of Alamut. The gaps in the mountains northeast of Qazvin were solidly filled with clouds that had crept up from the Caspian provinces, and even on the way to Tehran rain squalls struck the ship.

RESULTS OF THE FLIGHT TO NORTHWESTERN IRAN

In one week the "Friend of Iran," incomparable means for archeological scouting, had enabled us to complete the broad-scale exploration of western Azerbaijan and prepare an archeological map of the extensive basin of Lake Riza'iyah (Map 3). We subdivided this territory archeologically into the following sections:

Khu'i plain	Gadir-Sa'uj Bulaq plain
Dilman-Salmas plain	Bay of Maraghah
Bay of Guchi	Tabriz plain
Riza'iyah (Urmiah) plain	North shore
Southwest shore	Marand basin.

The focal sections, to judge by the density of the ancient settlements and by the size of the town deposits, are, in the west, Riza'iyah (Urmiah) plain with the neighboring bay of Guchi and, in the south, the plain of the Gadir and Sa'uj Bulaq rivers. The latter area was the homeland of the Mannai during the period of the Vannic empire.¹⁷ Sargon II tells of capturing a Mannean district whose cities were as "countless as the stars of heaven" and whose granaries were "without number."¹⁸ The numerous mounds in the Gadir-Sa'uj Bulaq plain may well be the tombs of such cities, once abounding in grain as do the modern settlements, to judge at least by the obvious fertility of the soil. The empire of Van (called also Urartu or Ararat, a biblical name familiar to us as that of the mountain region where Noah is said to have landed) included also the west shore of the lake, and future excavators will certainly find a Vannic stratum in many of the mounds of the Riza'iyah plain.

Map 3 shows a rather puzzling lack of balance between the western and eastern shores in density of ancient occupation. There are at present spots in the eastern plains as fertile as those

¹⁷ Cf. Emil Forrer, *Die Provinzeinteilung des assyrischen Reiches* (Leipzig, 1920) map at end; see also *Cambridge Ancient History* III (1929) map facing p. 186.

¹⁸ F. Thureau-Dangin, *Une relation de la huitième campagne de Sargon (714 av. J.-C.)* (Paris, 1912) p. 29.

in the west, for instance Bunab near Marand and Sardarud near Tabriz. But no mound indicates that these blessed patches of ground were occupied in ancient times. We are inclined to see a zone of restlessness, that is, transience, along the eastern shore, contrasting with a zone of more protected, sedentary life in the western and southern plains. In this regard, too, the spade will some time give an answer, when the layers of western and eastern sites can be compared. The map shows that the east is not entirely void of ancient towns; but how few compared with the areas mentioned above!

The outstanding single discovery of the flight to Azerbaijan is Dadan Rock on Shahi Island, with man-made chambers and basins cut into its summit. We assume for the time being that these are actually the remains of Hulagu's treasury and tomb. Proof can be furnished only by those who will ascend the rock.¹⁹

The most valuable concrete results are our aerial films, the oblique photographs of the mounds and other sites in their topographic settings and the vertical map views with such extraordinary "X-ray" effects as the view of the mound of Naqadah. The pictorial records of Dadan Rock, of Takht-i-Sulaiman, and of Ecbatana are striking examples of the value of air work in archeology.

¹⁹ In 1939 Donald N. Wilber of the staff of the American Institute for Iranian Art and Archaeology made an overland trip from Tabriz to Dadan Rock, after he had been supplied with aerial photographs of the site under consideration. He informed the writer orally that he could not discover positive evidence as to the period during which the site had been occupied. There were neither potsherds nor inscriptions nor remains of monumental architecture, with the exception of the cuts in the bedrock. Wilber suggests that the site may have been occupied by a stronghold of the Assassins. This is quite plausible; but it does not preclude re-occupation by Hulagu Khan after the destruction or surrender of the Assassins' castles.

*PLATES 73-92 * NORTHWESTERN IRAN*

PLATE 73

*THE VALLEY OF ALAMUT*

Though haze-streaked, this view gives an idea of the extremely rugged character of the "Valley of the Assassins." Every patch of soil is preserved for cultivation by terraces ascending the slopes of the protective mountain barrier which incloses all of Alamut. (*July 21, 1937; 6:50 A.M.; altitude, about 1,200 meters; temperature, 60° F.; 1/250 sec.; filter B; direction of view, S.*)



A. THE BLUE MOSQUE OF TABRIZ

The vertical view recording this famous building may be of interest to students of Islamic architecture. (July 22, 1937; 6:27 P.M.; altitude, 460 meters; 1/250 sec.; filter A.)



B. THE NORTHERN EDGE OF TABRIZ WITH TRACES OF ANCIENT BUILDINGS

The sky line is formed by the crest of the Yilan Dag ("Snake Mountain") with the sanctuary of Ainali-Zainali (upper left corner). In the foreground, at the edge of the town, several sharp-edged ruin formations are visible. (July 22, 1937; 6:32 P.M.; altitude, 300 meters; 1/250 sec.; filter A; direction of view, N.)



MOUND AT THE OUTSKIRTS OF MARAND

On account of the scarcity of mounds in the area east of Lake Riza'iyah (Urmiah) the site here shown has particular importance. It is situated at the southern edge of the small town. A conical hillock on the flat top of the oval mound is what remains of a building of the last stratum. A flatter deposit near the lower right corner of the photograph may also be of interest. (*July 23, 1937; 7:03 A.M.; altitude, about 450 meters; 1/250 sec.; filter A; direction of view, SW.*)



KHU'I, INCLOSED BY A WALL OF VAUBAN STYLE

An inner ruined defense wall of simpler type may be the fortification of Mongol times. If in imagination we should replace the elaborate Vauban fortress with the cruder defense system, we would see Mongol Khu'i as it may have looked six hundred years ago. (*July 23, 1937; 8:02 A.M.; altitude, about 600 meters; temperature, 68° F.; 1/250 sec.; filter A; direction of view, S.*)



THE WESTERN SHORE OF LAKE RIZA'IYYAH (PART OF THE PLAIN SOUTH OF GUCHI)

The mound of Aq Bulaq Tepesi (Pl. 78) is situated left of center. Its position can be determined by comparing on the various views the contours of the marshy spot near by. (July 25, 1937; 7 A.M.; altitude, 1,300 meters; temperature, 50° F.; 1/250 sec.; filter A; direction of view, S.)

A. THE MOUND NEAR AQ BULAQ TEPESI

The ruins of a stone-built structure are on top of the flat, good-sized hill. A hut village with circular corrals is in the foreground. The shore line of Lake Riza'iyah is visible near the upper edge of the photograph. (July 23, 1937; 10:44 A.M.; altitude, 230 meters; temperature, 75° F.; 1/250 sec.; filter B; direction of view, N.)

B. VERTICAL VIEW OF THE MOUND NEAR AQ BULAQ TEPESI

This map view suggests that a moat inclosed the circular site. At any rate a depression with relatively dark vegetation seems to encircle the mound. The contours of a boulder-built structure and of a deep excavation are clearly marked. Bays of dark-colored swamp extend close to the site. (July 25, 1937; 6:51 A.M.; altitude, 1,300 meters; 1/100 sec.; filter A.)

A



B





DADAN ROCK, PERHAPS THE SITE OF HULAGU'S TREASURY AND TOMB

The picture shows the bizarre eastern shore line of Shahi Island in Lake Riza'iyah. During the dry season the lake recedes, leaving the desert of salt and sand seen in this view. The man-made changes on the summit of Dadan Rock (in foreground) are shown on Plates 80–82. (*July 25, 1937; 6:08 A.M.; altitude, 530 meters; temperature, 58° F.; 1/250 sec.; no filter; direction of view, N.*)



*THE EASTERN FACE OF DADAN ROCK, WITH CHAMBERS NEAR ITS SUMMIT
WHICH MAY BE THE REMAINS OF HULAGU'S TREASURY AND TOMB*

Rock-hewn chambers, together with basins to gather the water of the winter rains, are visible on the inclined summit of this spur of Dadan Mountain. No explorer wandering and searching along normal roads on the face of the earth would be able to see the extraordinary changes made by human labor on the top of this precipitous cliff. (July 25, 1937; 6:05 A.M.; altitude, 530 meters; temperature, 58° F.; 1/250 sec.; no filter; direction of view, SW.)



CLOSE-UP OF DADAN ROCK

In addition to the three identical chambers two long rectangular rooms are visible on this view, and many water basins cut out of the living rock are distributed over the inclined summit. Debris of a building seems to be lying around the three chambers and the neighboring rooms. (*July 25, 1937; 6:08 A.M.; altitude, 530 meters above the plain; temperature, 58° F.; 1/250 sec.; no filter; direction of view, SE.*)

PLATE 82

VERTICAL VIEW OF DADAN ROCK

The light is not favorable for showing the details on the summit, the possible site of Hulagu's treasury and tomb, and the distribution of the water basins. But the strange form of the mountain is mapped by this photograph, and an important additional feature is indicated, namely the fortification protecting the original and presumably sole access to the mountain. (*July 25, 1937; 6:31 A.M.; altitude, 1,900 meters above the shore; temperature, 49°F.; 1/100 sec.; filter A.*)





MAP VIEW OF GUK TEPE, NORTHEAST OF SA'UJ BULAQ

Once more the growth of a mound is instructively illustrated. A fortlike structure is built on top of the main mound, which during preceding epochs too carried the strongest buildings and hence has risen higher than the adjacent deposit. The loosely built village encircling the principal hill will form a stratum of intermittent deposits on top of the preceding settlements. (*July 24, 1937; 8:30 A.M.; altitude, 950 meters; 1/250 sec.; filter A.*)



AN OCTAGONAL RUIN IN THE GUCHI PLAIN

It would be difficult to define from the air the period during which this site was occupied. However, we are certain that it belongs to one of the historical periods. It is a fortress with one entrance and incloses formations of buildings in patches which roughly parallel the outer wall contours. (*July 25, 1937; 6:54 A.M.; altitude, 1,300 meters; temperature, 50° F.; 1/100 sec.; filter A.*)



A. TEPE NAQADAH (NAKHUDA ON MAP) IN THE PLAIN OF THE GADIR RIVER

We made a risky landing in one of the near-by fields in order to gather samples of the ancient potsherds lying on the mound surface. But we did not notice the telltale lines that appear on B. (July 24, 1937; 10:24 A.M.; altitude, 330 meters; 1/250 sec.; filter A; direction of view, NNE.)



B. MAP VIEW OF TEPE NAQADAH IN THE GADIR PLAIN

This extraordinary "X ray" reveals the contours of an ancient fortification with eight round towers, buried below the present surface of the mound. No other device than the aerial photograph can reveal such a structure without excavation. The town of Naqadah covers the gently sloping extramural part of the mound deposit. This case illustrates the growth of the purely domiciliary part of a site during times of peace while the fortress mound skips one stratum. (July 25, 1937; 8:14 A.M.; altitude, 1,200 meters; 1/100 sec.; no filter.)



*TEPE ANGINAH AT THE NORTH END OF THE RIZAIYYAH
(URMIYAH) PLAIN*

The totally characterless deposit, roughly oval with irregular central knob, had been deserted for many centuries. A smaller mound is visible at the upper edge of the photograph. We landed near by and found many prehistoric sherds on the surface of the main site. (July 25, 1937; 7:08 A.M.; altitude, 1,450 meters; temperature, 50° F.; 1/250 sec.; filter A.)



THE RUINS OF TAKHT-I-SULAIMAN ("THRONE OF SOLOMON")

Once wrongly identified with Median Ecbatana, the fortress called Takht-i-Sulaiman, built on a natural elevation, includes structures from the Parthian period or earlier to Mongol times. Its greatest splendor falls in the time of the Sasanian empire. (*July 27, 1937; 8:16 A.M.; altitude, 1,000 meters; 1/250 sec.; filter A; direction of view, NE.*)



OBLIQUE CLOSE-UP OF TAKHT-I-SULAIMAN

With great clearness this picture shows the distribution of the various buildings on this important site. In the foreground one of the fortress gates is visible. (*July 27, 1937; 8:17 A.M.; altitude, 1,000 meters; 1/250 sec.; no filter; direction of view, SE.*)



MAP VIEW OF TAKHT-I-SULAIMAN

This view shows the rectangular arrangement of structures around the lake, with the fire temple in a prominent position. The roughened area in the lower left half of the walled-in terrain indicates the presence of many smaller buildings, perhaps the quarters of soldiers, attendants, and priests. (July 27, 1937; 8:10 A.M.; altitude, 1,650 meters; temperature, 44° F.; 1/100 sec.; filter A.)



A



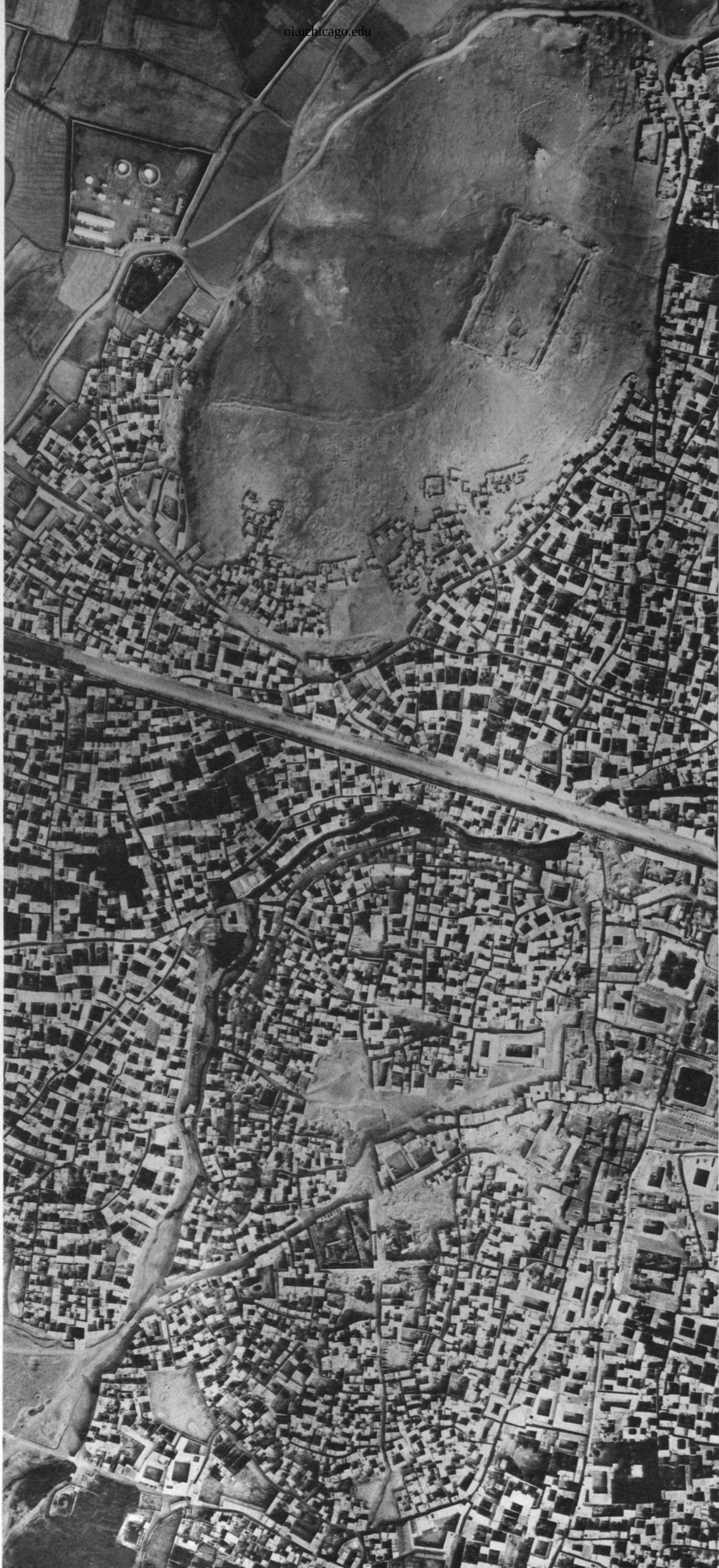
B

A. A HOLLOW CONOID ROCK NEAR TAKHT-I-SULAIMAN

We cannot help believing that this strange, presumably volcanic formation with its fire-blackened interior has a bearing on the presence of the important Sasanian sanctuary of Takht-i-Sulaiman visible near the upper edge of this view. (*July 27, 1937; 8:23 A.M.; altitude, 900 meters above the plain; 1/250 sec.; no filter; direction of view, E.*)

B. VERTICAL VIEW OF THE CRATER FORMATION SHOWN ON A

(*July 27, 1937; 7:46 A.M.; altitude, 1,700 meters above the plain; 1/100 sec.; no filter.*)





THE MOUND OF ECBATANA AND THE HILL AL-MUSALLA

The preceding vertical view is the more plastic; but, as usual, the natural setting of the site is better indicated by the oblique photograph. Rain squalls hide most of the background, the slope of Alvand Mountain, in one of whose valleys the Achaemenian king Xerxes left a trilingual inscription. (*July 28, 1937; 7:12 A.M.; altitude, about 600 meters; 1/250 sec.; filter A; direction of view, approximately S.*)

*VERTICAL VIEW OF THE MOUND OF ECBATANA, UNDERNEATH
PRESENT HAMADAN, AND THE HILL CALLED AL-MUSALLA*

The oval "hunchback," mostly covered with houses of modern Hamadan, is the core of the town deposit of Ecbatana, the capital of the Median empire and, later, one of the Achaemenian capitals. The oval city mound presumably contains the remains of the famous castle of the Median kings, while the hill al-Musalla, supposed by many to have been the site of this castle, appears blank except for the contours of a late historical fortress ruin with round towers and two gates. This photograph supplies the future excavator of Ecbatana with a map delimiting the most important part of the ancient city and giving him the distribution of modern buildings—an important technical factor for the initial organization of his work. (*July 27, 1937; 5:35 P.M.; altitude, 2,050 meters; temperature, 46° F.; 1/250 sec.; no filter.*)

AN AERIAL HUNT FOR ANCIENT SITES IN LURISTAN

ONE of the most striking archeological phenomena in Iran during the past decade was the accidental discovery of magnificent bronze objects in the rough mountain country of Luristan. The very inaccessibility of this western barrier of ancient Iran explains the fact that the culture of the Luristan bronze people remained unknown to archeology for such an unbelievably long time. Since the discovery of the highly elaborate cult objects of bronze and other metals much has been written;¹ but the forbidding character of the country and its rather savage population and also the reluctance of the authorities to grant permission have so far prevented fully equipped expeditions from penetrating far into the interior.

About thirty years ago Jacques de Morgan traveled through the Lurish mountains, but at that time nothing was known of the Luristan bronzes. André Godard examined the Harsin area in 1930.² His results are described in his publication mentioned in note 1. Dr. George C. Miles and the writer made an exploratory trip through the Rumishgan and Saimarrah valleys, followed up in 1935 by excavations in the valley of Rumishgan sponsored by Mrs. Christian R. Holmes and the American Institute for Iranian Art and Archaeology. This work was carried through under the writer's direction by the staff of the Rayy Expedition. Though Rumishgan was thoroughly tested and though the various soundings were successful in defining cultures of the 4th and 3d millennia and domiciliary deposits of the 1st millennium B.C., we did not uncover a single burial of the Luristan bronze culture which flourished during the first half of the 1st millennium B.C.

In 1936 obstacles beyond our control prevented our expedition from exploring and sounding the focal bronze regions between Rumishgan and the Kirmanshah-Harsin area. Sir Aurel Stein, however, made a trip through Luristan in that year. His route and results are reported in the

¹ Cf. André Godard, *Les bronzes du Luristân* ("Ars asiatica" XVII [Paris, 1931]), which includes a bibliography to which should be added articles in the *Illustrated London News* by E. Herzfeld June 1 and 8, 1929, and by A. U. Pope September 6 and 13, 1930; A. Moortgat, *Bronzegerät aus Luristan* (Berlin, 1932); Leon Legrain, *Luristan Bronzes in the University Museum* (Philadelphia, 1934); and other contributions not available to me in the field. [Other articles which might be mentioned are those of M. S. Dimand in *Bulletin of the Metropolitan Museum of Art* XXVI (1931) 48-50 and XXVIII (1933) 113 f., René Dussaud in *Syria* XIII (1932) 227-29 and XV (1934) 187-99, and Walter Baumgartner in *Archiv für Orientforschung* XII (1937/38) 57-59. Of special importance is the discussion in *A Survey of Persian Art*, ed. by Arthur Upham Pope (6 vols.; London and New York, 1938-39) I 254-85 and IV, Pls. 25-73.—EDITOR.]

² See *Syria* XI (1930) 271.

Geographical Journal XCII (1938) 313-42. At last, in 1937, our expedition, then operating solely at Persepolis, received permission to carry through its program of a sounding-reconnaissance into the area previously requested for its activities.

The application for a preparatory flight patrol with the "Friend of Iran" was graciously granted by the High Imperial Government. I would have disliked the idea of taking the expedition's caravan into the wild mountain country before knowing exactly where to lead it. Thus this section deals with the aerial reconnaissance, which was followed in the spring of 1938 by our overland expedition.

PERSEPOLIS-TEHRAN-KIRMANSHAH

It was late in the season, on November 9, when we left Persepolis airfield for Tehran and Luristan. As usual we took a rather straight course across the mountains between our center and the strange little cliff village of Yazd-i-Khast. But on this occasion we had a closer look at Asupās. The citadel of that small town is built on an oval mound, and several more *tepe*'s are in the vicinity. There was a short rest on the airfield of Isfahan, jewel of Safavid Persia. Then we circled over Tepe Siyalk near Kashan, where Roman Ghirshman was digging for the Louvre in Paris. We found some possible landing-spots for a future visit. A small paper parachute informed our colleagues that we would soon be calling. A fine tail wind took us to Tehran in a total flying time of three hours and seven minutes, our record flight.

Our flying companion, Lieutenant Zuhdi, had already been chosen. So in spite of a very gloomy sky we took off on the following morning, hoping for holes in the clouds to the west. The mounds between Tehran and Qazvin were once more checked; but as we were passing the latter town, from which the Safavid dynasty had shifted to Isfahan, rain squalls and a temperature near the freezing point forced us to land at the Qazvin field and to bide our time.

It was past noon when we tried again, though the southwest promised a rough ride. Quite a few mounds were added to the map of the strip between Qazvin and the pass of Sultan Bulaq, which was dipped in "pea soup," the flyer's accepted designation for a bad sky. Captain Benn wound his way through the gap in the ranges above the twisting highway. Too busy dodging the rocky slopes and the clouds hiding them, he did not have a chance to look at the map, and he was decidedly relieved when told that we were beyond the top. The clouds were closing in, and the temperature was 33° F., ready to form ice, as we slipped down into the wide plain of Hamadan.

Magnificent cumuli towered above the snow-capped Alvand Mountain rising south of Hamadan (Ecbatana), and clusters of clouds spreading sheets of rain forced us to undulate our route. The Asadabad Pass (Shah Pass) was wrapped in solid masses of black clouds. That way was blocked; but Benn saw a hole between a saddle of the Alvand and the ceiling of the clouds. We

*LURISTAN AND SOUTHERN KURDISTAN, BASED ON SURVEY OF INDIA MAPS
WITH THE PERMISSION OF THE SURVEYOR-GENERAL OF INDIA AND
OF THE CONTROLLER OF HIS MAJESTY'S STATIONERY OFFICE*

While the map of Luristan inside the back cover shows the sky tracks of our explorations of 1935, Map 4 records in red the results of our aerial hunt for ancient sites in 1937.



- | | | | |
|-----|------------------|---|-----------------------------------|
| --- | FLIGHT ROUTE | L | LANDING |
| ~ | MOUND | + | FLAT SETTLEMENT RUIN |
| x | ANCIENT CEMETERY | ■ | RUIN OF FORTRESS TYPE |
| ■ | ROCK RELIEF | ○ | AREA PARTICULARLY RICH IN REMAINS |

0 5 10 15 20 25 MILES
0 10 20 30 40 KILOMETERS

just managed to slip across, the altimeter showing exactly 10,000 feet. There was one large mound with pronounced fortress indication on its summit near Ravan, north of the Alvand Mountain. South of Asadabad near Jannatabad we saw another large circular mound with two excavations on its top. A circular inclosure appeared near Khunab, east of Asadabad.

Starting at Kangavar as the eastern point, we entered (see Route 1 on Map 4) the region for the intensive exploration of which I had received specific permission. The northern border was at the latitude of Sinnah, the southern through Hulailan and Khurramabad, and the western a line through Shahabad (formerly Harunabad). Rain squalls forced us south of Sahnah into the valley of the Gamas Rud. Even so we could not quite dodge the clouds as we approached the rain-swept silhouette of the Rock of Bisitun, and even seconds of blind flying seem long when roaring through valleys of rocky mountain country at a speed of 120 miles an hour. We did get to Kirmanshah, where we circled above the plant of the Anglo-Iranian Oil Company to announce that customers for airplane gasoline had arrived. Mud lumps flew when our pilot landed on the spacious but soft airfield; but he was too experienced to pull the brake—a ground loop might have been the result. It had been a rough ride, and his bloodshot eyes told the strain.

*GIRDLING THE MASSIF OF KUH-I-PARAU: THE PAIRAVAND COUNTRY
AND THE ROCK OF BISITUN*

We did not want to hurt the irreplaceable ship, precious in many respects known to those who have followed its fate. The field was too soft for taking off in wet weather. The Iranian government had recognized this fact and was just building stone-paved runways for the benefit of its own air line to be operated shortly. We took off in the late afternoon (see Route 2 on Map 4) to comb the valleys of the Pairavand Lurs—a zone known to the Tehran antiquity-dealers as prolific of bronze burials. We headed straight through the defile near the famous Taq-i-Bustan and northward into the basin of Naqar Khanah. The burial grounds of old Luristan are difficult to identify on rock-covered slopes, since the principal clues for the presence of the ancient graves are the stone slabs that covered them, sometimes still in place, more commonly scattered about by native treasure-hunters who have learned to know the second clue, namely their ancient predecessors' habit of burying their dead near springs in the valleys of their temporary habitats. We did not notice the first clue when flying a scalloped circle in the basin of Naqar Khanah and its side valleys; but we saw many spots worth testing with the excavator's spade, especially in the vicinity of the Tang-i-Kinisht. There was only one ruin, a faint circular inclosure on a low green hill, roughly in the center of the natural basin.

Two oblique photographs document the topographic setting in the center of the Pairavand Lurs, the homeland too of a division of the people of the Luristan bronze era. One (Pl. 93) shows

the little village of Pirandaz and the mountain ranges northeast of the basin, while the other (Pl. 94) illustrates the village and pastures of Pir-i-Ghaib not far from Kinisht and near the foot of the rough range protecting the valley toward the north.

Once more, as so often during the days to come, we passed Taq-i-Bustan ("Garden Grotto").³ Its most striking monument is the large grotto of Khusrau II, Parviz (A.D. 590–628), showing in central position this king mounted on his horse "Shabdiz," with hunting scenes on either side wall. A smaller grotto with reliefs of Shapur II and III and an unprotected relief of Ardashir II belong to the end of the 4th century after Christ.

The setting of the grottoes, beside a modern building and behind recently arranged gardens, is illustrated on Plate 95, which shows also a town deposit, presumably Sasanian, at the right. The hunting scenes in the grotto of Khusrau II may have some bearing on the extensive rectangular inclosure appearing in the foreground of Plate 96, which was taken on a stormy day. It is almost certain that this rectangle once bordered a "paradise" or game park, such as was frequently employed by Sasanian princes, though we must imagine forests and meadows in the former "paradise," where now are cultivated fields. A general view (Pl. 97) shows the plain of Kirmanshah and the Qara Su (Turkish: "Black River"), the rocky hill of Taq-i-Bustan, and the natural basin of Naqar Khanah or Kinisht.

In a serpentine course we next followed the contours of the "Pairavand mountain," which borders on the east the valleys of the Qara Su and the Ab-i-Razavar. Though we concentrated on defining the burial places of the people of the bronzes, we did not disregard the many mounds in the valley of Kirmanshah and northward. The map was soon dotted with symbols marking ancient *tepe*'s, towns, and other ruins. At Sih Chashmah ("Three Springs"), only a few kilometers west of Pir-i-Ghaib (cf. Pl. 94) but separated by the western border range of the Naqar Khanah basin, the dark dots marking springs at the foot of the range and near the heads of the side valleys looked particularly promising. Although no specific clue for the presence of ancient cemeteries was noticed, the spot was recorded by a photograph (Pl. 98) for enlarging and further analysis. A small village (Yavan?) upstream near the Ab-i-Razavar is another interesting spot. Its houses are built on the gentle slope of a mound topped by a crumbling fort of the Muslim period, once again illustrating the growth of such fortress hills (Pl. 99). The mound edge is buttressed by a defense wall presumably contemporaneous with the fort which it abuts.

Near the junction of the Razavar with the Kharbalan Rud, at the northwestern end of the "Pairavand mountain" complex, we turned eastward, following the course of the Razavar. Near the river bend a high mound, Tepe Qaisarvand, rises from the cultivated plain. It is such a

³ The reader interested in the description of these extraordinary Sasanian remains may consult Ernst Herzfeld, *Am Tor von Asien* (Berlin, 1920) pp. 57 ff.

pronounced topographic landmark that the Survey of India map (1:253,440) indicates its position. I shall refer to this site once more when describing our landing near by.

Although the plain of the upper Ab-i-Razavar (plain of Bilavar) and that of the Bilu'ab Chay (plain of Dinavar) are densely settled at the present time, we noticed there only a few ruin hills. However, our eyes were mainly glued to the gashes in the northern slope of the mountain. We may have missed some mounds in the open plain. But even the side valleys which we examined so closely did not reveal any specific clues as to cemeteries of the bronze era, though many springs may repay the efforts of an overland search.

An attractive photographic shot succeeded at a spot which we assume to be Buzrud (Pl. 100), set against the background of Zarin Kuh at the west end of the Dinavar plain. The fort of a presumably Kurdish chief and a little village crowd together on an old mound, illustrating, as so often, a future stratum which Chronos will add to the forgotten ones below.

Tang-i-Dinavar ("Defile of Dinavar") was a purple shadow with blinding silver streaks, rays of the sun soon to set. The pilot used his better judgment in continuing southeastward around the easternmost spur of the Kuh-i-Bavalin not far from Sahnah. In a winding course we surveyed the plain of Chamchamal. Not less than four mounds and a town site cluster about a rocky knoll (Tepe Shah Maran) rising in the center of this marshy triangle dotted with fertile patches.

Before landing on Kirmanshah airfield three minutes after sunset, we passed the Rock of Bisitun in the light of the setting sun. In closing this section I must explain in a few words the significance of Bisitun to those not familiar with Iranian monuments.⁴ On this "Mountain of the Gods," shown in all its majesty on Plate 101, Darius the Great immortalized in 520/19 B.C. the defeat of nine rebel kings, pretenders to the throne of Cyrus and Cambyses. In a relief high above what was once the royal road connecting Babylon with Ecbatana, the victorious Darius is pictured, beneath his foot Gaumata, the false Smerdis, and before him, bareheaded and with wrists tied behind their backs, the eight other rebels, in addition to a Scythian subsequently added. Behind Darius stand two of his highest dignitaries, the carriers of the royal lance and the royal bow. In Old Persian, Elamite, and Babylonian Darius narrates his victories over the pretenders. It was the Persian text of this "Rosetta Stone" of Assyriology which enabled Henry Rawlinson, following Grotefend's initial steps, to decipher the inscription and thus to start the "decoding" of the other ancient languages written in cuneiform characters. The Rock of Bisitun is therefore not only a monument to the preserver of the empire of Cyrus; it also immortalizes a basic achievement of science.

⁴ Detailed descriptions may be found in Sarre and Herzfeld, *Iranische Felsreliefs*, pp. 189-98 and Pls. XXXIII-XXXV, and Herzfeld, *Am Tor von Asien*, pp. 16-23 and Pls. IX f.

Two Parthian reliefs, of Mithradates II and Gotarzes II respectively, have been cut into the base of the mountain below the monument of Darius. An extensive area near by, smoothed but otherwise unmarked, was presumably prepared for a further relief that was never executed.

*THE FORTRESS OF SARMAJ; KANGAVAR, SUNQUR, AND A MOUNTAIN
CASTLE NEAR SINNAH (ROUTE 3 ON MAP 4)*

We wished the Kirmanshah runways had already been built. We lost precious morning hours and the best relief of the ground by waiting for the field to dry up after heavy night dew. Our first goal was Sarmaj, 9 kilometers east-southeast of the Bisitun relief. We were following the request of M. Godard, the director of the Service of Antiquities, who wanted photographs of this site of Buwaihîd fame (see Pls. 102-3). Especially the vertical view beautifully shows the square castle of Hasanawaih, who died here in A.D. 979. Built of hewn stone and considered impregnable, it was yet conquered in A.D. 1049 by Tughril the Seljuk after a siege of four years, by "100,000 men," as claimed by Muslim historians.⁵

Then we saw our first definite Luristan cemetery. It was south of Sahnah and one kilometer east of the village of Darka, and it was being dug by bronze-hunters! A view of another burial ground (Pl. 114) fairly well illustrates this cemetery as well as others we saw during our flight. All seem to be in nooks of the valleys, or at least at the bases of the hills. Pronounced vegetation, a dark patch on the soil, a tree or two—these indicate the presence of a spring, which was apparently always essential for the welfare of the dead of these still puzzling people. There were two more ancient cemeteries between Sahnah and Kangavar. One is about one kilometer north-east of Sarab Bid Surkh, the second about one kilometer south of Bazav.

An oblique and a vertical view (Pl. 104) illustrate Kangavar, the site of the famous temple of Anahit, an ancient Iranian goddess usually identified with the Greek Artemis. The structure, attributed by Herzfeld to the 1st century of our era,⁶ is now largely covered by the houses of the modern town; but the vertical air view clearly marks a part of the rectangular foundation, which according to Flandin extended over an area of more than 200 meters in both directions.⁷ Ker Porter even declares that the temple area covered a square measuring 300 yards on each side.⁸ A. V. Williams Jackson gained at first the impression that there were two structures of importance

⁵ Le Strange, *The Lands of the Eastern Caliphate*, p. 189. Le Strange did not know the position of Sarmaj; but it is now indicated on the Survey of India map.

⁶ *Iranische Felsreliefs*, p. 231.

⁷ Flandin and Coste, *Voyage en Perse ... pendant les années 1840 et 1841* I 411.

⁸ Sir Robert Ker Porter, *Travels in Georgia, Persia, Armenia, Ancient Babylonia, &c. &c. during the Years 1817, 1818, 1819, and 1820* (London, 1821-22) II 141.

instead of one.⁹ Our aerial photographs show also the contours of town ruins on the hills bordering the present town.

When combing the environs of Kangavar we noticed a circular mound below the present village of Karkhanah (Pl. 105). As usual, the ruin deposit may extend farther into the plain than evidenced by the pronounced elevation. In the case of single-occupational sites the latter may actually be nothing more than the fortress deposit.

We turned northwest toward Sunqur, plotting two large circular mounds en route. The village of Kavanah covers part of one, with conoid center, while the other is called Qara Tepe ("Black Hill"). Sunqur itself does not seem to offer any attraction for our science; it is a small modern town.

Then the Gavah Rud dictated our flight line to Sinnah. There are quite a few mounds along the middle (i.e., east-west) course of this river. But farther downstream, where the valley turns northward, and on up into the canyon of the tributary Qishlaq Rud the country is very rough indeed. Between Sarab, near the river bend, and Sinnah we noticed only one ruin (Pls. 106-7), one of those extraordinary mountain castles which the explorer toiling along on the paths of the valleys may never be able to find. This stronghold of an unknown period of Kurdistan lies 8,000 feet above the level of the sea. It seems to be identical with a nameless fort marked on the Survey of India map 2 kilometers south of the village of Haradan, which in its turn is about 6 kilometers southwest of Sinnah. The two views illustrate the rough hills and mountains of the Kurdish country, and it can easily be understood that Assyria had difficulties at times in keeping its overlordship over the peoples of this part of the empire. The nameless stronghold on the mountain has an inner fortress, on the very summit, and an outer defense wall which includes a spring at the lowermost tip of the fortification system. The presence of the spring is indicated by large trees and by bushes growing at this spot. In the distance the Karju Rud, accompanied by mosaics of cultivation, cuts through the wilderness of conoid peaks.

Sinnah had been set as the northern limit of our exploration area. We would have liked to land, in order to "check in." But there was no spot where the "Friend of Iran" could land without breakage. Very rough ranges loomed in the west. A short loop convinced us that it was advisable to fly back to our base along the valleys through which we had come. But at the bend of the Gavah Rud near Sarab we branched off and followed the new Sinnah-Kirmanshah highway. In a semicircle we combed the small plain of the Darrah Kubgar, where three mounds were "bagged."

Once more we saw Tepe Qaisarvand near the bend of the Ab-i-Razavar. The fine truncated cone looked too tempting to miss a chance for landing. While I took the photograph here shown

⁹ *Persia Past and Present*, pp. 237-42.

(Pl. 108) the captain went through the usual maneuvers of circling and “dragging,” and finally we were on solid ground about a kilometer north of the hill. The surface pottery showed a strange mixture. There was plain handmade red-slipped ware of Anatolian Alishar I type. Yellowish brown sherds, wheelmade, one with gray core, together with red-washed sherds, reminded me very definitely of the pottery of Alishar II. One striped sherd was identical with painted ware of the 3d millennium which we found in the valley of Rumishgan in southern Luristan. Sherds of perhaps the same prehistoric era have finger-printed ridges such as we found in the south also. There were dark gray sherds resembling the early Iron Age pottery of Murtazagird near Tehran and of Tepe Siyalk near Kashan. Sasanian rim profiles like those found at Istakhr near Persepolis also occurred, and an Islamic stratum was defined by some glazed sherds with green dashes on white, others with incised designs below a glossy white coat, and one with a grayish white coat over purplish brown incisions.

Tepe Qaisarvand seems to be the most important site in the plain of Pishtarvan or Bilāvar (as the natives and the map respectively called it).

Once more we retraced part of a former route, following the valley of the Ab-i-Razavar; but at Lalabad we turned westward, combing the plain of Karazal Creek and mapping quite a number of mounds. Returning to Kirmanshah we recorded a sample of a relatively recent fortress formation, Qal‘ah Kuhnah, 4 kilometers north of town on the Qara Su (Pl. 111). According to Herzfeld¹⁰ it is a fortress of Vauban or Asfeld style, built by Nadir Shah about a hundred years ago. Its contours are so similar to those of the present inclosure of Khūi (Pl. 76) that we must attribute about the same age to both of them.

*THE HEART OF UNKNOWN LURISTAN: THROUGH THE QARA SU-
SAIMARRAH VALLEY, HULAILAN, AND MAHI DASHT
(ROUTE 4 ON MAP 4)*

So far our explorations had been confined to the area north of the royal road connecting Babylon and Ecbatana in ancient times. Now the south was our aim. Storm clouds were looming in the southwest when we took off on November 14 to comb the valley of the Qara Su-Saimarra. At Giyalajar, about 2 kilometers northwest of the junction of the Gamas Rud and the Qara Su, we noticed an ancient burial ground destroyed by diggings. Then the valley turned into a purple cleft in the rocky mountains, cut out by the Qara Su in the course of past eons. Kuh Hasan Husain, opposite the junction of the Ganjuvan River, is about 8,000 feet high, not “7297” as the map states so decidedly.

¹⁰ *Am Tor von Asien*, p. 57.

Adapting our sky way to the tortuous course of the river below, we were relieved to strike an opening at Ziyarat ("Place of Pilgrimage") Mukhalan, where also a small circular mound is situated. South of this point on the map the river soon turns into a dotted line, and rightfully so. Its course is not straight, as the map indicates. It winds in tortuous serpentines; and west of the spot marked "Aorān" (Avran) on the Survey of India map, where apparently the Qara Su changes its name to Saimarraḥ, the river as mapped is off about 20 kilometers. It does not turn northwest; it undulates southwestward. After a canyon, Tang-i-Tir, near Avran the valley broadened and became absorbingly interesting to us.

From here to the plain of Hulailan the banks of the river are covered with the contours of ruined towns, usually faint streaks of white boulder rectangles. But the most prominent of all is a compact "pueblo" built on a knoll not far from the south bank of the river. An oblique close-up (Pl. 109) clearly shows the contours of this town of problematical antiquity, while a second oblique view (Pl. 110) records in addition the true course of the Saimarraḥ River and the plain of Hulailan.

Two years before, when Rumishgan was our center, we had landed near the track seen on Plate 112 *A* leading past Tepe Kazavat I, illumined on the photograph by a patch of sunlight. Painted sherds of the 3d millennium were found on the surface of that mound. Tepe Kazavat II, to the right of the larger hill, supplied in addition fragments of historical periods. The village of Hulailan is seen a few kilometers west of these mounds. The ground looked too moist for landing. So we went on, heading northwestward for Shahabad (Harunabad), first across thinly wooded country and then through the fertile valleys of the Tang Huttasan and Cham Shiyan creeks, recording quite a few mounds en route.

Storm clouds pushed us northeastward, and we had to dodge Shahabad; but we used the opportunity to comb once more the southern part of the Mahi Dasht ("Fish Plain"), over which we had flown two years before. One of the finest mounds south of the old royal road, which crosses this plain, is near the southeastern tip (Pl. 112 *B*). The village built on the slope of the conoid hill is Sarkar Pa'in, as far as we could make out. Still, as to mound archeology, the northern half of the Mahi Dasht is the more promising, as was noted by George Miles and the writer during an overland excursion in 1934 and confirmed by our subsequent flight explorations (see pp. 46 f.).

While returning, flying downstream from Ab-i-Marik to the village of Mahidasht, we plotted several mounds in the environs of Siyah Chigha ("Black Mound"). A medium-sized, low, circular *tepe* was noticed one kilometer north of Qal'ah Naqi, and another mound of the same shape was found directly south of the village of Mahidasht. Then the clouds caught up with us, and a tail wind whipped the "Friend of Iran" back to its base at Kirmanshah.

*LURISTAN BURIAL GROUNDS AND ANCIENT CENTERS OF SEDENTARY LIFE
VIA HARSIN, KHURRAMABAD, AND KUH-I-DASHT
(ROUTE 5 ON MAP 4)*

We had lost November 13 and 15 due to rain and dreary skies, and on November 16 the wet field held us until it was nearly noon. But a clear sky was overhead, fringed with cloud puffs at the horizon. Our projected flight route was to Harsin, Khurramabad, and places west. Again we passed the Rock of Bisitun; but then we swerved southward to follow the valley of the Gamas Rud. At its junction with the Qara Su we turned eastward and crossed a stretch of archeologically apparently sterile hills.

The hunt started in the basin of Harsin, famous as the first center of trading in Luristan bronzes. General views were taken to record the topographic setting of this spot (Pl. 113). Our illustration shows the lofty range bordering the north end of the plain. Several passes cross this range, and the southern ascent of the Khurkhur and Dar Ballut passes looked particularly promising as to possible sites of ancient cemeteries. We also noticed two cemeteries, one northeast, the other southeast, of the village of Hasan Bakhvah below the pass of the same name. But both had been destroyed by bronze-diggers. The same is true for the burial grounds near Zazarm and Tamrag, indicated on Map 4. We illustrate as another typical example of the location of such an ancient cemetery the site one kilometer southeast of Tamrag in the east end of the Harsin plain (Pl. 114). Trees and a patch of cultivation indicate the presence of a spring. The honey-combed burial area shows the slabs of the tomb inclosures scattered about by the diggers. Traces of ancient boulder-built houses appear at the right. More boulder ruins may be at the lower and upper left. Two mounds each were plotted near Zazarm and south of Harsin. The Harsin basin was instructive for us. It supplied good examples of the sites for which we were searching in particular; but we left the plain with the feeling that the Lurs had pretty well cleaned out the cemeteries of their ancient predecessors.

We hopped across the eastern border range, at first guided by the Khurramabad highway; but upon reaching the first stream we turned southward and followed it to its junction with the Badavar Rud. On Map 4 the point "5400," about 2 kilometers north of this junction, is marked by a red circle, a sign of archeological attractiveness, although the only definite trace of antiquity is a mound. A burial ground may be near the junction of the two rivers. Here and along the course of the Badavar we plotted nine modern villages not indicated on our map. In a gentle arc we returned to the highway, striking it again in the plain called Dasht-i-Khavah, roughly near Chashmah Kabud.

Here started an intermittent strip of sedentary centers, loose clusters of mounds. The second

center was the environment of Dumavizah, near a village marked Sinjabi on the map. Then followed the mounds in the plain of Alishtar, where a French expedition once operated. Now came a gap until the highway approached Tang-i-Ribat, where a small plain is quite dotted with small and medium-sized ruin hills. The next center is the plain of Khurramabad, where good-sized mounds are scattered near each bank of the Ab-i-Khurramabad.

The field where we landed had been greatly improved since the time, two years before, when the "Friend of Iran" did not dare to land there and had to find a spot 2 miles west of town. Our military companion, Lieutenant Zuhdi, reported to the commander of the garrison, and after a teahouse lunch we were off, heading west again to spots where beasts of burden are the only other means of transport.

Our first aim was Kuh-i-Dasht, a plain of great archeological interest, as we had found out during our first flight explorations, in 1935. The Ab-i-Khurramabad was our guide until we crossed it south of its junction with the Kashgan Rud and south of a mound 2 kilometers northeast of this junction, the westernmost *tepe* of the Khurramabad group.

Rough bottom spreads between the Kashgan Rud and the flat plain called Kuh-i-Dasht. Map 4 shows that this patch of Luristan is well dotted with remains of sedentary people of past millennia—mounds and, near the rocky border ranges, ruins of boulder-built settlements. There is one mound of particular fascination. It appears as a conical knob on our illustration of Kuh-i-Dasht (Pl. 115). In 1935 we landed close to it; but, when we examined the surface, it was sterile. This fact, combined with its steep conoid shape, suggests that the hillock is a tumulus, a tomb rather than a domiciliary mound. But freaks occur, and only an excavation can tell about the perhaps precious core of this cone of dirt. I should have liked to land, but the surface looked too wet to the pilot; and in such a case the opinion of the captain of the ship is always final.

Shortly after leaving the plain and its western border ranges we entered the country attributed by the map, perhaps falsely, to the "Itiawand" Lurs, coinciding apparently with the long valley of Kishmahar. Flying northwestward we soon left the thin forest filling its southeastern end and entered a broad, rather flat valley. Many mosaics of cultivation show the labor of villages along its margins, and even more numerous boulder towns of ancient times line sections of the plain. No village was shown on the map, which turns very vague indeed in the interior of Luristan; and nothing on the map distinguished this attractive valley from many others inclosed by the stereotyped southeast-northwest ridges of the Luristan mountains. On Plate 116 we illustrate one of the boulder ruins at the northeast border of the Kishmahar valley. Not all the stone piles and inclosures represent contours of ancient dwellings. Wall stones of the latter at times serve the present-day shepherd to make corrals for his flocks, and the peasant throws stones toward the edges of his field. Originally, however, such boulder-covered areas as are shown on our illustration

appear to have been settlements of ancient times. In the valley of Rumishgan at the ruin called Mirvali, similar to the patch here shown, we found stone cist graves which we tentatively attribute to the 3d millennium B.C.

Again we crossed the Saimarra River and the promising area 15 to 20 kilometers northeast of Hulailan. A few minutes later—a day's journey on horseback—we crossed the Mahi Dasht and headed straight for Kirmanshah. I may add however that, before crossing from the Hulailan country into the Mahi Dasht, near the northwestern tip of the valley called Chashmah Sulaihu we plotted several inhabited villages, a mound, and a spot which looked suspiciously like the site of an ancient cemetery.

This flight and the one to follow were the most decisive reconnaissances for the subsequent overland expedition. In three and a half hours we had mapped out more work than a sounding expedition of several months could hope to accomplish.

*AERIAL SERPENTINES IN LITTLE KNOWN AND UNMAPPED COUNTRY:
SARKHALAJ, TANG-I-CHARASH, KASHGAN RUD, KUH-I-DASHT, AND
HULAILAN (ROUTE 6 ON MAP 4)*

A beautiful clear sky spread overhead when we took off on November 17 at 11:03 A.M. with temperature 52° F. We aimed first at the outer northern slopes of the mountains inclosing the Harsin basin. As far as Bisitun there was nothing to add to the archeological map; beyond there, when we were swerving in and out through the valleys of the mountains north of Harsin, quite a few ruin hills could be plotted. We struck the Gamas Rud again at 'Amalah; but soon, at Cham Surkh, we turned southeastward and headed for the basin of Sarkhalaj, which appeared interesting on the map because of its secluded position. The little village looked attractive in its setting of green meadows surrounded by an alpine landscape. Besides that we found two mounds and a boulder ruin at this secluded spot. But when we tried to get out we had to spiral skyward for many minutes to clear the formidable ranges inclosing Sarkhalaj.

We crossed the gorge of Talaqah and circumnavigated the 10,000-foot peak (not "9207" as on the map) of Sitan Kuh. Five modern villages and a horseshoe-shaped boulder ruin were mapped south of the pass called Gardanah Dulusagan.

Now the flight course made a loop northwestward to the basin of Namban, combing the outer, eastern slopes of the border ranges of Harsin. Shortly before rejoining a former sky track, at a point 5 or 6 kilometers east of Gardanah Gashur and within a radius of 2 kilometers we counted four nameless villages, three boulder ruins, a mound, and what appeared to be a burial ground. A red circle on Map 4 marks this promising patch, which I have to admit we had missed when passing close by on the day before.

We retraced part of our former route while heading for the Tang-i-Charash. Then new land followed when we roared through the gorge and in a roughly elliptical course entirely circumnavigated the Kuh-i-Busanah, via Imam Bavatir (the tomb and sanctuary of one of the real or assumed descendants of the Prophet), Ganjuvan River, Tang-i-Garmav (where the precipitous canyon of the Qara Su starts), and Darrah Gizaru, and then flew eastward again, following the river for 24 kilometers to its junction with the Kangavari southwest of Tang-i-Charash. Here we turned southeastward and found in the valley of this tributary another area (called Sarkishti, as we learned later) of great interest for our science. For a distance of about 13 kilometers we marked the blank map with modern villages, mounds, ancient cemeteries, and a boulder ruin. But then followed desolate wilderness without any traces of recent or ancient occupation. The map became a hopeless instrument of disorientation. We crossed and followed streams which had never found a place on it; but at last we struck the Kashgan Rud not far from the spot where the Survey of India map shows Kaka Dar, though we did not notice this village. After we had crossed the river we swerved westward once more and crossed it again where it turns to the southeast. Rough and apparently lifeless valleys spread northwestward from our course.

When we had arrived at a point about 25 kilometers north of the plain of Kuh-i-Dasht we started to wind southward above a thinly wooded valley between Kuh Manall and Kuh Nar-khangah. At last the Kuh-i-Dasht spread out before us. We circled for landing and found a perfect spot on the alluvial soil directly east of a little town (not originally marked on the map) and of the creek flowing by it. We had instructive talks with the officials—the governor, a captain, and the chief of education—while sipping our tea; but they could not give any information about burial grounds of the people of the bronze culture.

Map 4 shows the mounds and boulder ruins in the plain of Kuh-i-Dasht plotted during our various visits to this important little culture center of ancient Luristan. When leaving Kuh-i-Dasht we noticed another interesting mound in the westernmost tip of the plain. It is inside an area filled with boulder foundations. Once more we combed the “Itiawand” or Kishmahar valley, but upon arriving in the Hulailan plain we turned southwestward for a short distance, following and again correcting the course of the Saimarra River.

Somewhere in the very vaguely surveyed chaos of mountains between Hulailan and the valley of Ab-i-Chanarah we entered four occupied villages, that is, clusters of mud houses, and three areas covered with the ruins of boulder-built settlements. We illustrate one of these boulder-covered patches (Pl. 117) showing the contours of houses and terraces, perhaps retaining walls for former cultivation. There are also rows of holes, the traces of modern Lurish camps that have moved on. An occupied village camp is seen on the bank of the river.

This point ended the day's explorations. In country as rough as Luristan the pilot prefers to

have a very safe margin of gasoline. A forced landing would be hopeless in many parts of this mountainous wilderness. We turned north and flew as the arrow flies, across the ranges and across the Mahi Dasht to the Kirmanshah airport, where Fred Lillich, as always, was ready with fresh gasoline and with a big tool box, just in case something had gone wrong.

*MOUND-MAPPING WEST OF KIRMANSHAH: HULAILAN, SHAHABAD
(HARUNABAD), AND NORTHERN MAHI DASHT
(ROUTE 7 ON MAP 4)*

The line from Khurramabad to Hulailan was the southern border of the zone for which I had requested permission. Shahabad, formerly Harunabad, was our western limit. We did not want to miss the southwest corner of our territory, and the point where we had had to cut short the flight on the preceding day had proved so interesting that we headed straight back to the same spot. In a little more than half an hour, at reduced exploration speed, we were again at the junction of the Saimarra and the Ab-i-Chanarah, a voyage of about four days by car and on horseback.

We followed the Ab-i-Chanarah westward. Its course is not straight, as the map suggests in broken line. It undulates in its fertile valley, dotted with a number of villages which the map does not mention. We noticed some boulder ruins here as well as in the valley of the Ab-i-Asmanabad, where in addition two mounds were plotted. Across the Vardalan Range we swerved into the gorge of the Chakan Rud, reversing our course. But at the southeastern spur of the mountains, not far from the village of Dar Badam, we turned northwest again into the valley of the Cham Ravand, which passes Shahabad (Harunabad).

At once we found ourselves in a region of mounds which includes also the valley of the Cham Shiyan, a tributary of the Cham Ravand. Certain mounds in this area, and particularly in the most prolific mound country, the near-by Mahi Dasht, are not just hillocks; they are the remains of towns that played significant roles in the history of the ancient world. Here the excavator will find the painted potteries of early prehistoric times. In these valleys between the barrier ranges of Iran he will determine the interrelations of the highland and the empires of ancient Mesopotamia. Assur held sway over these territories, and its culture must have mingled with that of the plateau. Then came the empires of Iran, interrupted by Alexander and his successors, and finally the Arabs and Islam. The map shows numberless mounds which await the excavator's spade.

We circled Shahabad (Harunabad); but the ground glistened with moisture. It would have been a bad landing. Once, two years before (p. 46), we had found fine painted pottery of prehistoric times in the exposed base of the big mound encircled by the present town. After Shahabad our course was northeast, following the highway; but right after crossing into the Mahi Dasht we turned straight north toward Ravansir, 50 kilometers away. For plotting a territory it is simplest,

of course, to follow one of the main directions of the compass; and the Mahi Dasht, as shown on Map 4, is so prolific of remains of antiquity that the most adequate flight line was required. When combing the valleys east and north of Ravansir one boulder ruin only recompensed us for the sharp banks and turns at the valley heads. Still, though we did not see more definite clues, the area looks archeologically attractive.

Now we wound across green hills, beautiful rolling country, northwest of Ravansir. There seems to be a greater precipitation here than elsewhere in the area we had seen, to judge by its verdure. We flew northwest as far as Hamran, then south to Naravi, then northwest again to Shingan. Returning to the plain through a narrow valley from Chashmah Kuli Khan past Nilavah, we came upon one of the most interesting mound formations of the Mahi Dasht (Pl. 118)—one of those city ruins incapsulated in the crust formed by its own debris. The village situated at its base is Malik Shah, as far as we were able to determine. The sharp edge of the oval town mound indicates the presence of a defense wall, and the elevated central portion is the citadel hill. The furrow across the center of the latter can only be explained by the existence of two separated complexes beneath the surface. This mound was once an extremely compact and well protected town, and it is certain that quite a number of occupational strata will here be found.

Near this point we joined our former flight line again, retracing it toward the south as far as the highway; then we covered in a gentle arc a strip 10 kilometers north of the highway and the valley west of the Qara Su to Kirmanshah.

HOMEWARD BOUND (ROUTE 8 ON MAP 4)

In spite of the disturbing muddiness of the Kirmanshah field, which cost us the best hours of each day, we had been fortunate. Though the season was advanced beyond safe flying time, spells of reasonably clear weather had enabled us to complete nearly our entire program of explorations within the area of operations permitted to us. We accomplished that in six flying days with Kirmanshah as base.

The northeastern and northwestern corners of our territory remained to be explored when, in the morning of November 19, a solid bank of storm clouds swept up from the west. As far as we could foretell, they would ground and maroon us for days. It was time to nose east and home. Fred Lillich packed his tools and reserve parts, which we luckily did not need on this reconnaissance, and at 10:24 A.M. airplane and car left for Tehran, where the plane arrived at 1:18 P.M.

Bisitun was photographed once more. Then, in order to have at least a look at the northeast corner of our territory, we turned north, passing again the mound-girdled Tepe Shah Maran in the plain of Chamchamal. Below Gardanah Bavalin we noticed a possible burial ground. Sunqur passed by, while our course changed to east and then to northeast after crossing the fertile valleys

of the upper Gavah Rud and an unnamed tributary near Av Barik. In the hills to the northeast and, later on, in the plain crossed by the highway from Qurvah to Hamadan we did not notice any particularly interesting remains of antiquity. This highway was our guide southeastward to Hamadan, where we saw once more the swell of Ecbatana beneath the modern city.

From Hamadan we took the short cut along the ancient caravan route which followed the Qara Chay–Mazdaqan Chay, instead of making the detour via Qazvin. We flew on a rather straight course and may have missed some ancient sites; but the only mounds we noticed between the plains of Hamadan and Tehran (starting at the Rud-i-Shur) were clustered in the Zaraghan–Zarrah area. The vagueness of the map as to road, rivers, and mountains shows that this route is little used. In winter it certainly is impassable for automobiles, and even in summer it would be an adventurous trip.

Before crossing the Rud-i-Shur and entering the plain of Tehran we noticed southeast of Mahmudabad a circular citadel formation; but I am sorry to say we missed the Sasanian remains (Takht-i-Rustam) on the hillock near Qajar described by Herzfeld¹¹ and more fully by Maxime Siroux,¹² though we saw two mounds near Qishlaq Hidayat.

We were floating 8,000 feet above the level of Tehran. Mount Damavand, the “Fujiyama” of Iran, which had been a landmark to us for more than 100 miles, rose with its snow-capped peak above the panorama of mountains and sheets of clouds. Below lay Rayy, the ancient predecessor of Tehran, but sunk now below the surface of the cultivated plain, where the Philadelphia–Boston expedition had uncovered patches of the ancient city during the past years and where our camp had been in the Bagh-i-Safa’iyyah (“Garden of Serenity”). Our photograph, Plate 119, records the scene—Rayy, the Elburz Mountains, and majestic Damavand—as we saw it before the “Friend of Iran” circled down again to the airfield of Dushan Tepe.

Clouds of another kind had gathered. After six days we received permission to return to Persepolis—the last flight of the season and our last flight over ancient Iran.

THE RESULTS OF THE LURISTAN FLIGHT

Our archeological map of Luristan—topographically the most difficult part of Iran—is dotted with symbols for mounds, town ruins, burial grounds, and other traces of antiquity. The routes for the overland expedition to Luristan were clearly outlined by the discoveries of the exploratory flights. Doubtless there are many points of archeological importance which we missed; but the relative density of those sites which we noticed furnishes a very good clue to the presence of

¹¹ Most recently in his *Archaeological History of Iran* (London, 1935) pp. 88 f. and Pl. XV.

¹² In *Athār-e Irān* III (1938) 93–105.

further sites of interest in the same regions. The most characteristic aerial discovery is, once more, a mountain stronghold, the fortress south of Sinnah illustrated on Plates 106-7. However, for the overland expedition to follow, the most significant results were the boulder ruins and the burial grounds which we found, together with the clues for the presence of the latter gathered during our far-flung reconnaissances over the plains and hidden valleys of Luristan.

Our flight explorations revealed an important archeological grouping of ancient remains in the territory examined. There are pronounced sedentary centers, either extensive mound-covered areas such as the Mahi Dasht or small oases of ruin hills clustered in mountain-locked plains or valleys. A second group we might call seminomadic. It is apparently typified by certain boulder-built settlements and by cemeteries of the bronze period situated as a rule in the side valleys near springs, active or dried up. But we do not believe that the people who made the extraordinary Luristan bronzes were the settlers whose houses now form parts of the mounds in the plains which they once tilled. The culture of the bronzes was carried by nomadic or seminomadic people whose annual routine was very much like that of the modern Lurs, who until recently drifted from winter quarters to summer pastures and vice versa. From Dr. Packard, the well known and esteemed American physician in Kirmanshah, we heard that the Lurs will bring their dead to the summer camps to be buried in the mountains near the pastures of their flocks. Should we see here a survival of times long past? On the other hand, the culture of the ancient people who produced the bronzes of Luristan was infinitely higher than that of the Lurish nomads of our day. Where did they make their bronzes? Where are their furnaces? How did it happen that just here, in this secluded mountain wilderness, such an extraordinary development of artistic metallurgy occurred? The overland expedition to Luristan was to have many problems to solve.

Since this chapter on our aerial explorations in Luristan was written, the second overland expedition to Luristan, carried through by the staff of the Persepolis Expedition, has followed the sky tracks of the "Friend of Iran." Sponsored in its turn by Mrs. Christian R. Holmes and by the American Institute for Iranian Art and Archaeology, the caravan of the expedition crossed the rough ranges southeast of the Kirmanshah area. In the plain of Kuh-i-Dasht, at the base of Surkhah Dum-i-Lur Mountain, we discovered a sanctuary of the 8th-7th century B.C. (period of the Assyrian Empire)—a veritable treasure hoard for our science; and in the valley of the Bada-var Rud burials of the people of the bronzes were uncovered. The striking results of this epic trek will be published as soon as the numerous finds are worked up¹³—results due to a great extent to the preceding reconnaissances of our aerial scout.

¹³ The writer presented in 1938 a preliminary account of this overland expedition in the American Institute's *Bulletin* V 205-16.

*PLATES 93-119 * WEST CENTRAL IRAN*



*THE MOUNTAIN BASIN NORTH OF TAQ-I-BUSTAN NEAR KIRMANSHAH: THE
VILLAGE OF PIRANDAŽ AND ASCENT TO TANG-I-LULAN*

There is no definable archeological subject here. Yet the little side valleys may harbor burial grounds of the period of the Luristan bronzes. Here is the homeland of the Pairavand tribe of modern Lurs. (*November 11, 1937; 3:27 P.M.; altitude, 185 meters; 1/250 sec.; filter A; direction of view, NE.*)



*ANOTHER VIEW OF THE HOME OF THE PAIRAVAND TRIBE: THE VILLAGE
OF PIR-I-GHAIB NEAR TANG-I-KINISHT*

Many Luristan bronzes have been found in the vicinity of Tang-i-Kinisht ("Defile of Kinisht").
(November 11, 1937; 3:31 P.M.; altitude, 300 meters; 1/250 sec.; filter A; direction of view, N.)

TAQ-I-BUSTAN

The arches of two grottoes with Sasanian reliefs are near a modern building at the foot of the rock. A town deposit fills the lower right corner of the picture. (November 11, 1937; 3:42 P.M.; altitude, 90 meters; 1/250 sec.; filter A; direction of view, NW.)



PLATE 96

*RECTANGULAR INCLOSURE, PRESUMABLY A "PARADISE" OR HUNTING PARK,
NEAR TAQ-I-BUSTAN*

The hunting scenes of Taq-i-Bustan (in center) may have a bearing on the inclosure seen in lower left corner, which probably bordered a game park in which Sasanian princes hunted. (*November 16, 1937; 4:43 P.M.; altitude, 980 meters; 1/250 sec.; filter A; direction of view, N.*)





*GENERAL VIEW OF THE MOUNTAIN OF TAQ-I-BUSTAN WITH THE HOME-
LAND OF THE PAIRAVAND TRIBE BEYOND*

This view documents the natural setting of this famous spot (just right of center), with a part of the Kirmanshah plain, once crossed by the royal road from Babylon to Ecbatana. (*November 17, 1937; 4:05 P.M.; altitude, 1,250 meters; 1/250 sec.; filter B; direction of view, NW.*)



SIH CHASHMAH, WEST OF THE "PAIRAVAND BASIN"

Pir-i-Ghaib (Pl. 94) is situated on the opposite side of the mountain. The dark patches in the small valley in the center are springs. The ancient occupants of this area preferred such spots for burying their dead. (November 11, 1937; 3:54 P.M.; altitude, 330 meters; 1/250 sec.; filter A; direction of view, NE.)

YAVAN(?) TEPE, IN THE VALLEY OF THE AB-I-RAZAVAR

A ruined stronghold of the Muslim period crowns the ancient fortress mound, and the village assumed to be Yavan covers part of the ancient town deposit, largely inclosed by a defense wall of the same period as the fortress. Yavan(?) too is a striking example of the irregular growth of a mound, for the present village will form a new stratum in a very limited area only. The Muslim fortress continues the habit of the ancient settlers to build a citadel on the highest point of the site, and the town inclosure has started to give the debris formation the sharp edge often noticed at mounds of ancient walled settlements. (November 12, 1937; 3:03 P.M.; altitude, 330 meters; 1/250 sec.; filter A; direction of view, N.)





A DENSELY OCCUPIED MOUND, BUZRUD IN THE DINAVAR PLAIN

The mound itself is hardly visible below the strong village fort and the surrounding houses snuggling up to it. The entire settlement is built on top of its ancient predecessors. (*November 11, 1937; 4:28 P.M.; altitude, 350 meters; 1/250 sec.; filter A; direction of view, NW.*)



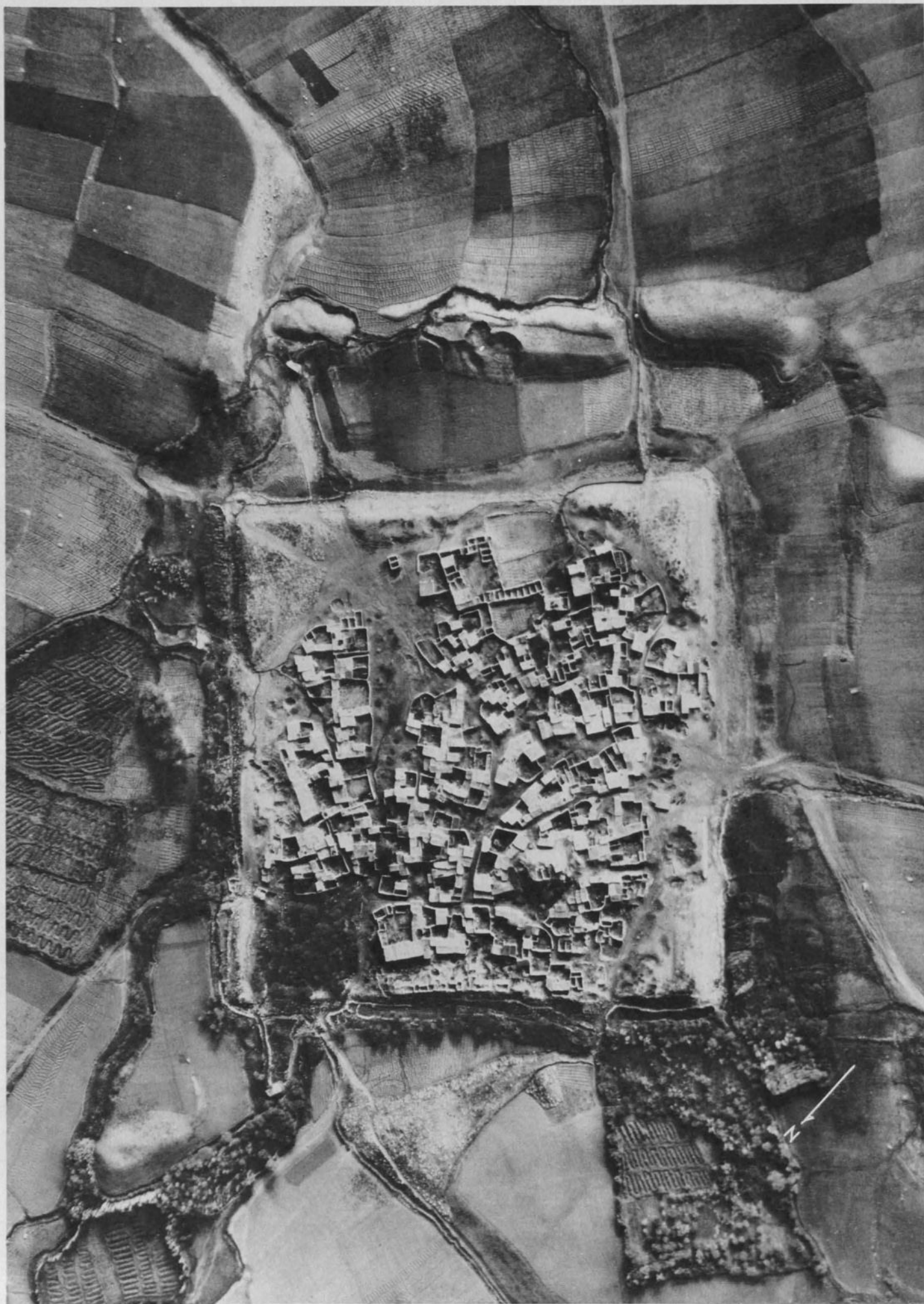
THE ROCK OF BISITUN

On this impressive monument of nature Darius the Great immortalized the defeat of nine rebel kings. The inscription on Darius' relief became the "Rosetta Stone" of Assyriology through its partial decipherment by Henry Rawlinson. (*November 16, 1937; 11:50 A.M.; altitude, 520 meters; 1/250 sec.; filter A; direction of view, NW.*)



SARMAḠ, SOUTHEAST OF BISITUN

The little modern town is built on the fortress of Hasanawaih the Buwaihid, which was conquered by Tughril the Seljuk in A.D. 1049. (*November 12, 1937; 9:54 A.M.; altitude, 750 meters; 1/250 sec.; filter A; direction of view, S.*)



VERTICAL VIEW OF SARMAʿ AND THE FORTRESS OF HASANAWAIH

The sharp borders of this interesting site mark at a glance a rectangular fortress. Stone piles lining its edge indicate the building material of the foundations at least. Dirt debris rising quite high at certain points shows that mud brick also was used to a considerable extent. The highest elevation, near the lower right corner of the fortress, suggests the debris mound of an outstanding structure. (November 12, 1937; 10:11 A.M.; altitude, 1,500 meters; 1/250 sec.; filter A.)



A. GENERAL VIEW OF KANGAVAR, THE SITE OF A TEMPLE OF ANAHIT

A comparison with *B* indicates the site of the famous structure. The hill in the foreground also seems to show structural contours. (November 12, 1937; 10:37 A.M.; altitude, 1,050 meters; 1/250 sec.; filter A; direction of view, SW.)



B. VERTICAL VIEW OF KANGAVAR WITH THE RUINS OF THE TEMPLE OF ANAHIT

The ruin area is a pitted rectangle cropping out from below the modern houses in the center of the picture. The larger part of the ancient site is covered by the modern town. (November 12, 1937; 10:27 A.M.; altitude, 1,500 meters; 1/250 sec.; filter A.)



MOUND AND VILLAGE OF KARKHANAH, EAST OF KANGAVAR

The sharp edge of the hill indicates that a defense wall once encircled the ancient site. The most pronounced deposit is seen at the edge toward the bottom of the photograph. (November 12, 1937; 10:29 A.M.; altitude, 1,500 meters; 1/250 sec.; filter A.)



A FORTRESS IN THE KURDISH MOUNTAINS

This mountain castle of unknown age crowns a summit south of Sinnah. Its discovery is a striking example of the value of aerial exploration. (*November 12, 1937; 11:38 A.M.; altitude, 300 meters above the summit, which is about 2,440 meters above sea-level; temperature, 34° F.; 1/250 sec.; filter A; direction of view, W.*)



CLOSE-UP OF THE STRONGHOLD IN THE KURDISH MOUNTAINS

The interesting site shows traces of one extensive building on the very summit. It is a rectangular structure with many small divisions. A square deposit rises directly below the faintly marked entrance to the palatial construction. The defense wall extends a considerable distance downhill, apparently for the sole purpose of including a spring the presence of which is marked only by a tall tree and bushes in the immediate surroundings. (*November 12, 1937; 11:38 A.M.; altitude, 300 meters above the summit; temperature, 34° F.; 1/250 sec.; filter A; direction of view, WNW.*)

TEPE QAISARVAND

We landed at some distance to the left of the interesting truncated cone, which shows the raised edge of a fortification as the last stratum of its occupation. Razavar Creek is seen in the distance. (*November 12, 1937; 12:23 P.M.; altitude, 300 meters; 1/250 sec.; filter A; direction of view, S.*)



RUINS OF A BOULDER-BUILT TOWN ON THE SAIMARRAH RIVER

This is the most compact site of a type which we saw frequently during our explorations in Luristan. Often the "boulder ruins" consist of scattered buildings. (November 14, 1937; 11:43 A.M.; altitude, about 400 meters; 1/250 sec.; filter A; direction of view, W.)





*GENERAL VIEW OF THE HULAILAN PLAIN WITH THE SAIMARRAH RIVER
AND THE BOULDER RUIN SHOWN ON PLATE 109*

The ruin is in the immediate foreground near the center of the picture. Hulailan is marked by a dark patch in the distance, at the foot of the mountain range which borders the plain. (*November 14, 1937; 11:43 A.M.; altitude, about 400 meters; 1/250 sec.; filter A; direction of view, SW.*)



QALAH KUHNAH ("ANCIENT FORTRESS") IN THE KIRMANSHAH PLAIN

The town inclosure of Khu'i (Pl. 76), north of Lake Riza'iyyah, shows the same style of fortification, usually called Vauban style. But the fortress pictured here has been deserted for several generations. The house clusters of Kirmanshah are in the background at left. (November 12, 1937; 3:34 P.M.; altitude, 330 meters; 1/250 sec.; filter A; direction of view, SW.)



A. TWO MOUNDS NEAR HULAILAN

The plain of Hulailan is one of the characteristic small centers of sedentary cultures in Luristan, as shown by these mounds. The village of Hulailan is at the base of the mountains. (November 14, 1937; 12:29 P.M.; altitude, 150 meters; 1/250 sec.; filter A; direction of view, W.)



B. THE MOUND OF SARKAR PA'IN(?) IN THE MAHI DASHT

The most prominent site in the southern part of the plain called Mahi Dasht is the hill here shown. The village partly situated on its slope seems to be Sarkar Pa'in. A crumbling watchtower and well defined contours of a ruined fort are visible on the apex of the mound. (November 14, 1937; 1:33 P.M.; altitude, about 200 meters; 1/250 sec.; filter A; direction of view, N.)



THE NORTHERN BORDER RANGE OF THE HARSIN VALLEY

The town of Harsin was a principal center of the trade in Luristan bronzes. This is due mainly to its location, convenient for the Lurish mountaineers; but we saw several destroyed burial grounds and some spots still offering possibilities for further discoveries. (*November 16, 1937; 12:33 P.M.; altitude, about 750 meters; 1/250 sec.; filter A; direction of view, NW.*)

*A DESTROYED CEMETERY OF THE PERIOD OF THE BRONZES NEAR TAMRAG
IN THE HARSIN VALLEY*

This view serves as an example for many other sites of burial grounds of this type. Trees and cultivation mark the presence of a spring. Beyond, in the lower center of the picture, the site of the cemetery, which has been totally destroyed by bronze-hunters, is betrayed by a patch with many pits and by tomb slabs scattered about. (November 16, 1937; 12:34 P.M.; altitude, about 200 meters; 1/250 sec.; filter A; direction of view, S.)





A CONOID MOUND IN THE KUH-I-DASHT

This plain, to a greater extent even than Hulailan and Rumishgan and many other secluded spots in Luristan, is also a sedentary center. One of several mounds occurring here is shown in the lower left corner of the picture. (*November 16, 1937; 3:54 P.M.; altitude, 520 meters; 1/250 sec.; filter A; direction of view, NW.*)



BOULDER RUINS IN A VALLEY BETWEEN KUH-I-DASHT AND HULAILAN

In contrast with the compact little town on the Saimarra (Pl. 109) the remains here shown are scattered inclosures. A mound formation is in the lower left corner. (November 16, 1937; 4:13 P.M.; altitude, about 700 meters; 1/250 sec.; filter A; direction of view, E.)



BOULDER RUINS SOUTHWEST OF HULAILAN

On the map we can only approximately point out the spot where these ruins are situated. There are contours of building sections, terraces of boulders, and traces of deserted modern camp sites, in addition to a small village on the bank of the river. (*November 17, 1937; 3:38 P.M.; altitude, about 600 meters; 1/250 sec.; filter A; direction of view, W.*)



A



B

A. THE CITY MOUND OF MALIK SHAH

The extraordinary town, incapsulated in a shell of its own debris, is inclosed by the cultivation mosaic of the fertile Mahi Dasht, where it doubtless played a historic role during some period of its life. Its geographic position may enable a historian to identify it with one of the towns of Assyria which held sway in this part of Iran during the first half of the 1st millennium B.C. (*November 18, 1937; 1:45 P.M.; altitude, about 350 meters; 1/250 sec.; filter B; direction of view, approximately S.*)

B. CLOSE-UP OF MALIK SHAH TEPE

Some time in the future the excavator's spade will break the crust of this unusual city mound and reveal its history, which may illumine the relations of the Mesopotamian lowlands with the highland cultures of Iran during those periods that left their traces in this huge deposit of superimposed human settlements. (*November 18, 1937; 1:47 P.M.; altitude, about 350 meters; 1/250 sec.; filter B; direction of view, approximately W.*)



MOUNT DAMAVAND ABOVE THE PLAIN OF RAYY

The snow-capped cone of the most beautiful mountain in Iran rises above the Elburz Range beyond the little town of Shah 'Abdu'l-'Azim and its inclosing fields, which now cover the ruins of Rayy. The Seljuk capital, one of the most splendid cities of its time, has disappeared from the face of the earth. A tomb tower, a few mud hillocks, and surface sherds of its precious ceramics mark the site of the former city. (November 19, 1937; 1:20 P.M.; altitude, 2,500 meters; temperature, 22° F.; 1/250 sec.; no filter; direction of view, NE.)

RETROSPECT.

THE last words of this book on aerial archeology are being written about three years after that day in August, 1935, when our silvery "Friend of Iran" first winged its way across the deserts and oases of ancient Iran. This concrete symbol of our comradeship became a veritable guardian spirit of the expeditions to Rayy, to Persepolis, and to Luristan. Many times it carried us between the distant centers of our work. It enabled us to map in an ideal manner the areas of our ground operations and to guide the latter, reducing the costly element of chance. Mary-Helen's foundation for aerial research in archeology has compiled an invaluable corpus of aerial photographs, a unique documentation of the remains of ancient Iran. In accordance with the ideal of the enterprise the results of our flights over points of scientific interest to American, French, German, and British fellow-students were made available to them.

Aerial research offers infinite possibilities for our science. Explorations, combined, where technically possible, with landings near interesting points, can be accomplished in an incredibly short time. Aerial photographs covering vast territories supply an ideal documentation of sites in their topographic environment. Such views enable the historian to identify mounds with settlements mentioned in ancient records, and the excavator is given a selection of desirable centers for his work. The vertical air view gives the excavator his map, and he can plan his operations intelligently. The ground survey, requiring several months and considerable expenditures, is displaced by the air map, complete in a few days or, if need be, in a few hours. Surface clues often invisible from the ground but seen from above guide the explorer in his overland voyages. Last, but not least, the flying archeologist gains infinite joy and satisfaction from his combined tasks in the air and on the ground.

Since our first attempts at aerial archeology the Aeronautical Department of the expeditions has developed into an efficient organization able to cope with its tasks within the technical limitations of its equipment and within the radius in which it is permitted to operate. Our methods have advanced in every respect. Our eyes have become trained to see remains of antiquity where formerly we disregarded odd discolorations of the surface of the earth. Photographs which we once considered inadequate have turned into veritable "X-ray" views with details of absorbing interest. Analysis of archeological air views has to be learned by comparing with one another photographs taken at different times of the day, at different seasons, or under different climatic conditions and by comparing photographs with the actual ground.

At this point I want to remember some pioneers in the field of aerial archeology. In the last war the British, German, and French flyers directed attention to the observation of ancient sites in Mesopotamia and in other regions where the alluvial plains ideally preserve the contours of former structures. Père Antoine Poidebard made an excellent air survey of the Roman limes in Syria¹ and has now extended his air research to the submerged harbors of ancient Tyre.² In O. G. S. Crawford's journal *Antiquity* various articles with analyses of archeological air views have been published.³ Colonel Charles A. Lindbergh and Alfred V. Kidder discovered from the air Maya ruins in the primeval jungles of Central America, and extremely interesting ancient remains have been observed and photographed by Lt. George R. Johnson during flights in Peru, the land of the Incas.⁴ R. Holzhausen has dealt with the harbor of Caesarea, now submerged below the surface of the Mediterranean on the Palestine coast.⁵ The place of the air-borne camera in facilitating the study of prehistory is beginning to receive recognition in scientific papers and conferences.⁶ In Iraq the Royal Air Force aids the excavators by putting aerial photographs at their disposal. All these men, and others whose names and work I do not know, have made archeology air-minded and helped to increase the horizon of our science.

¹ *La trace de Rome dans le désert de Syrie; le limes de Trajan à la conquête arabe; recherches aériennes (1925-1932)* (Paris, 1934).

² *Un grand port disparu: Tyr. Recherches aériennes et sous-marines, 1934-1936* (2 vols.; Paris, 1939).

³ E.g. *Antiquity* VII (1933) 290-96 (ancient structures in England).

⁴ Lt. George R. Johnson, *Peru from the Air* (American Geographical Society, "Special Publication" No. 12 [New York, 1930]), views taken in 1928-29; Robert Shippee, "Air adventures in Peru . . . , with illustrations from photographs by Lieut. George R. Johnson," *National Geographic Magazine* LXIII (1933) 81-120, views taken in 1931 or 1932.

⁵ See "Deutsche Flieger im Dienst der Archäologie" (*Deutsche Luftwacht: Luftwelt* II [Berlin, 1935] 487-89).

⁶ See E. Ewald, "Luftbild im Dienste der vor- und frühgeschichtlichen Forschung," *Bildmessung und Luftbildwesen* XIII (1938) 79-82, and Hansa Luftbild, *Luftbild und Vorgeschichte* ("Luftbild und Luftbildmessung," No. 16 [Berlin, 1938]).

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Geographic names have in general been transliterated by Dr. A. A. Brux as exactly as available data permit. In only a few well known names, such as Azerbaijan and Tehran, has a current English spelling been adopted. The diacritical marks required for completeness are given on Maps 1 and 2 and the maps on the end papers, as well as in the Index, but are not used in the text. Some unevenness of treatment results from the fact that, when names or elements of names could not be definitely identified, we have followed the best sources available even when their methods of transliteration are inconsistent with ours.

Names of places in Iran, Afghanistan, and Baluchistan have been treated as though all Persian; in Iraq, as though all Arabic; and in the Soviet Union, as though all Russian. In fact, however, Iranian names are not all Persian but include many of Kurdish, Turkish, or Arabic origin. Hence corresponding current Turkish spellings of names of Turkish origin—the group presenting the greatest variations—are sometimes added in the Index.

Because of dialectal variations the *written* rather than locally *spoken* forms of geographic names have been chosen. Sources used in determining the forms include

MAPS

Survey of India sheets, 1:1,000,000 and 1:253,440
 Bartholomew's map of the Near East, 1:4,000,000 (1934)
 British General Staff map of Persia and Afghanistan, No. 2149, 1:4,055,040 (1934)
 Various sheets of the series Asia, 1:1,000,000
 Various sheets of the series Southwestern Asia, 1:506,880
 French maps by the Service géographique de l'armée, 1:1,000,000, of the area south and east of the Caspian
 Russian government maps, 1:1,500,000, of the Caspian area

BOOKS

Encyclopaedia of Islām (Leyden, 1913—)
 Yāqūt, Arabic text and also extracted French translation (*Dictionnaire géographique, historique et littéraire de la Perse ...* [Paris, 1861]) by C. Barbier de Meynard
 Paul Schwarz, *Iran im Mittelalter nach den arabischen Geographien* (Leipzig, 1896–1934)
 Permanent Committee on Geographical Names for British Official Use, lists of names in Persia, Iraq, and Arabia
 Great Britain. Admiralty, *A Handbook of Mesopotamia I–II* (London, 1916–17)
 D. L. R. Lorimer, *The Phonology of the Bakhtiari, Badakhshani, and Madaglashti Dialects of Modern Persian, with Vocabularies* (London, 1922)
 Karl Hadank, *Mundarten der Gûrân* (Berlin, 1930)
 J. A. Vullers, *Lexicon Persico-Latinum etymologicum* (Bonnae, 1855–64)
 Gholam Ali Tarbiat, *Farhange Tarbiat, iranisch-deutsches Wörterbuch* (Teheran, 1315/1937)
 F. Steingass, *A Comprehensive Persian-English Dictionary* (2d impr.; London, 1930).

Because of differences in transliteration methods or because of uncertainties in interpretation many of the name forms used on other maps of Iran and its neighbors, including the Survey of India maps which serve as bases for our Maps 3 and 4, vary from those here adopted as the more exact. The letter *e*, for example, frequent in others' spellings, can in Persian and Arabic be written only as *a* or *i*. To facilitate recognition of the many varieties of spellings in use, this and analogous variations in the treatment of individual letters by others are noted in the Index under the letters concerned. For less systematic differences of form some individual cross references are given. These include several complete changes of name made in Iran within recent years, such as Hārūnābād to Shāhābād, Urmīyah to Rīzā'īyyah, and more lately Šā'uj Bulāq to Māhābād.

Topographic features of Iran are not always designated by the same term, and even the same feature may be named in different languages on different maps. Thus we may find Kūh-i-Savalān and Savalān Dāgh, Zinjān Rūd and Zinjān Chāy. Examples of more or less equivalent terms are:

For streams: *āb* (P.), *sū* (T.), "water, river"
rūd (P.), "river"
chāy (T. *çay*), *cham* (K.), "stream, river"
darrah (K. and P. > T. *dere*), "valley, stream"
khaur (> *khūr*; A.), "valley; inlet; salt-incrusted ground"
 For springs: *chashmah* (P.), *bulāq* (T. *bulak*), *kānī* (K. < P. *khānī*)
 For bodies of water: *daryā* (P.), "sea"
daryāchah (P.), *gūl* (T. *göl*), "lake"
gaud (P.), "deep; pit, low ground (=swamp?)"
hāmūn (P.), "plain; desert (also swamp?)"

For mountains: *kūh* (P.), *dūgh* (T. *dağ*), *jabal* (A.); cf. *sar* (P.), "head; summit, peak"
 For passes: *tang* (P.), *gardanah* (P.), *millah* (K.)
 For cities and towns: *ābād* (P.), "abode, city" (common as last term in compound city names)
 gird (P.), "round; city"
 shahr (P.), "city, town"
 dih (P.), "town, village"
 For mounds: *tepe* (P.; more exactly, *tappeh*), *chighā* (K.), *tall* (A.)
 For castles: *diz* (P.), *dīz* (P.), *dazh* (P.), *gal'ah* (A.), *kushk* (K.), "fortress, castle"
 ḥiṣār (A.), "citadel, castle"
 qaṣr (A.), "castle, palace"
 For tombs: *turbat* (A.), "tomb, mausoleum"
 imāmzādah (P.), "son of an *imām*; tomb of a descendant of Muḥammad"

Other terms to be noted are:

bandar (P.), "harbor"
dasht (P.) and *hāmūn* (P.), "plain; desert"
pul (P.), "bridge"
qishlāq (T. *kışlak*), "winter quarters"
rās (A. *ra's*), "head; headland"
ribāt (A.), "caravanserai."

The abbreviations A., K., P., and T. used here stand for Arabic, Kurdish, Persian, and Turkish respectively.

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